



MISSOURI BOTANICAL GARDEN
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GEORGE ENGELMANN
BOTANICAL NOTEBOOKS

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5 tabs

31

P. Pinea

470-4



0 1 2 3 4 5 6 7 8 9 10

cm

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MISSOURI
BOTANICAL
GARDEN

MISSOURI BOTANICAL GARDEN
GEORGE ENGELMANN PAPERS

11483



0 1 2 3 4 5 6 7 8 9 10

cm

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MISSOURI
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GARDEN

Pinus Pinea

June 1864
11th July 1865

Size of Pollen
x 415

Beyrout, Kotschy 528 (1855)
male ament sent by Cosson



$\frac{15.8 - 17.6 \text{ mostly } 16.8}{415} = 0.038 - 0.043$
mostly 0.040 lin

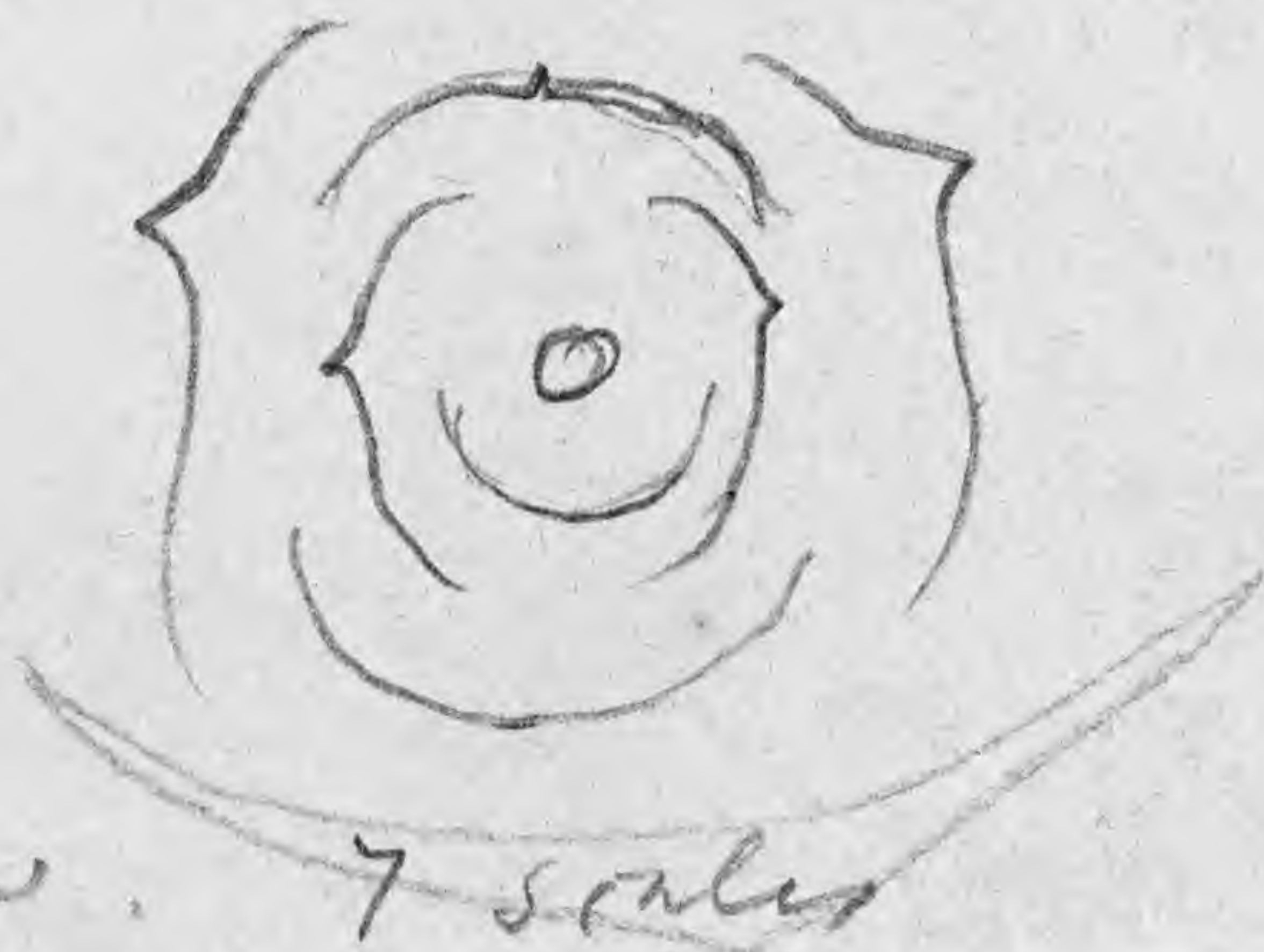
$\frac{32.8 - 36.8 \text{ mostly } 35}{415}$
0.079 - 0.090
mostly 0.084 mm



anther x10

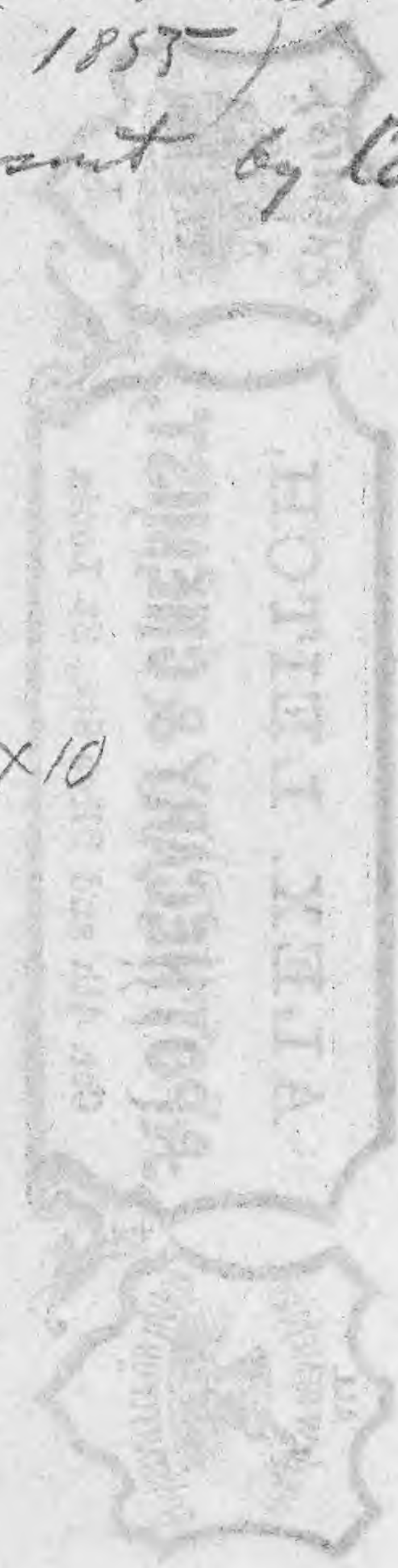


x4



posterior view

7 scales



0 1 2 3 4 5 6 7 8 9 10

cm

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ALEX. LEITCH,

APOTHECARY & CHEMIST,

Cor. 4th and Olive Sts., St. Louis.



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cm

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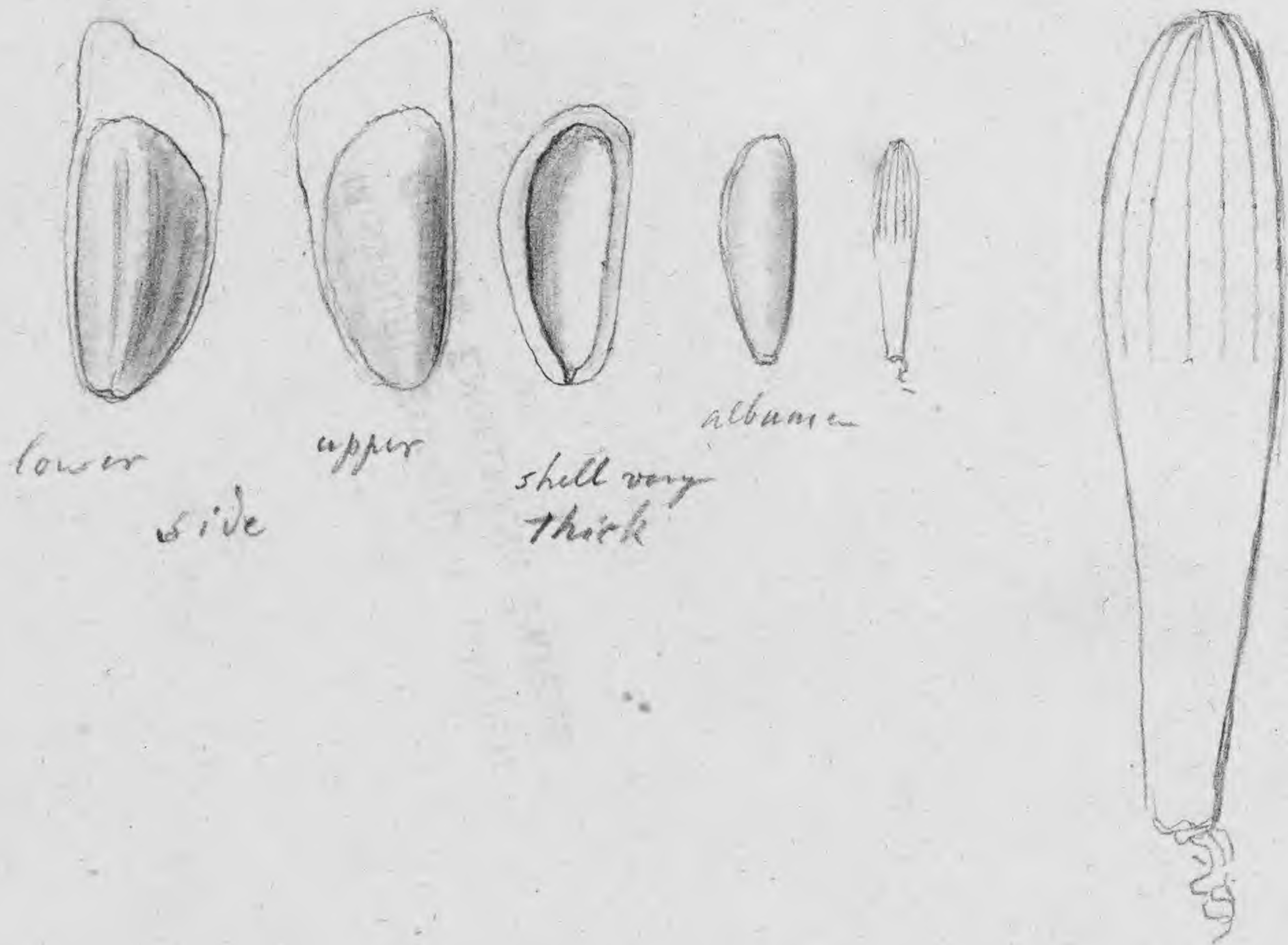


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Pinus pinaster L

April 24 1865

Naples March 1858.



2 embryos with 11 cotyle
2 ———— 12

Cotyleds not quite half
the length of the whole
embryo
abt twice its diameter



0 1 2 3 4 5 6 7 8 9 10

cm

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cm

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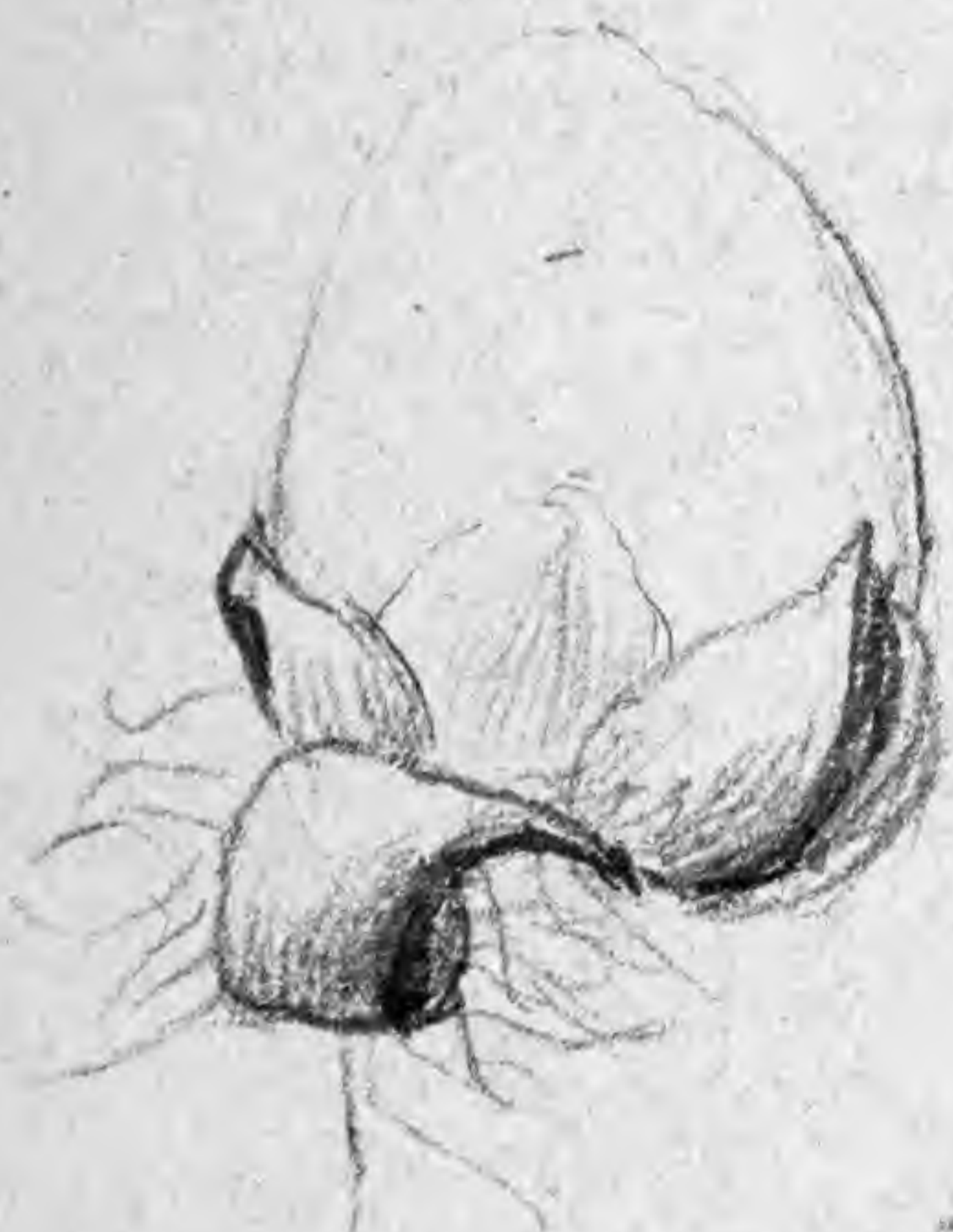
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Pinus Pinna

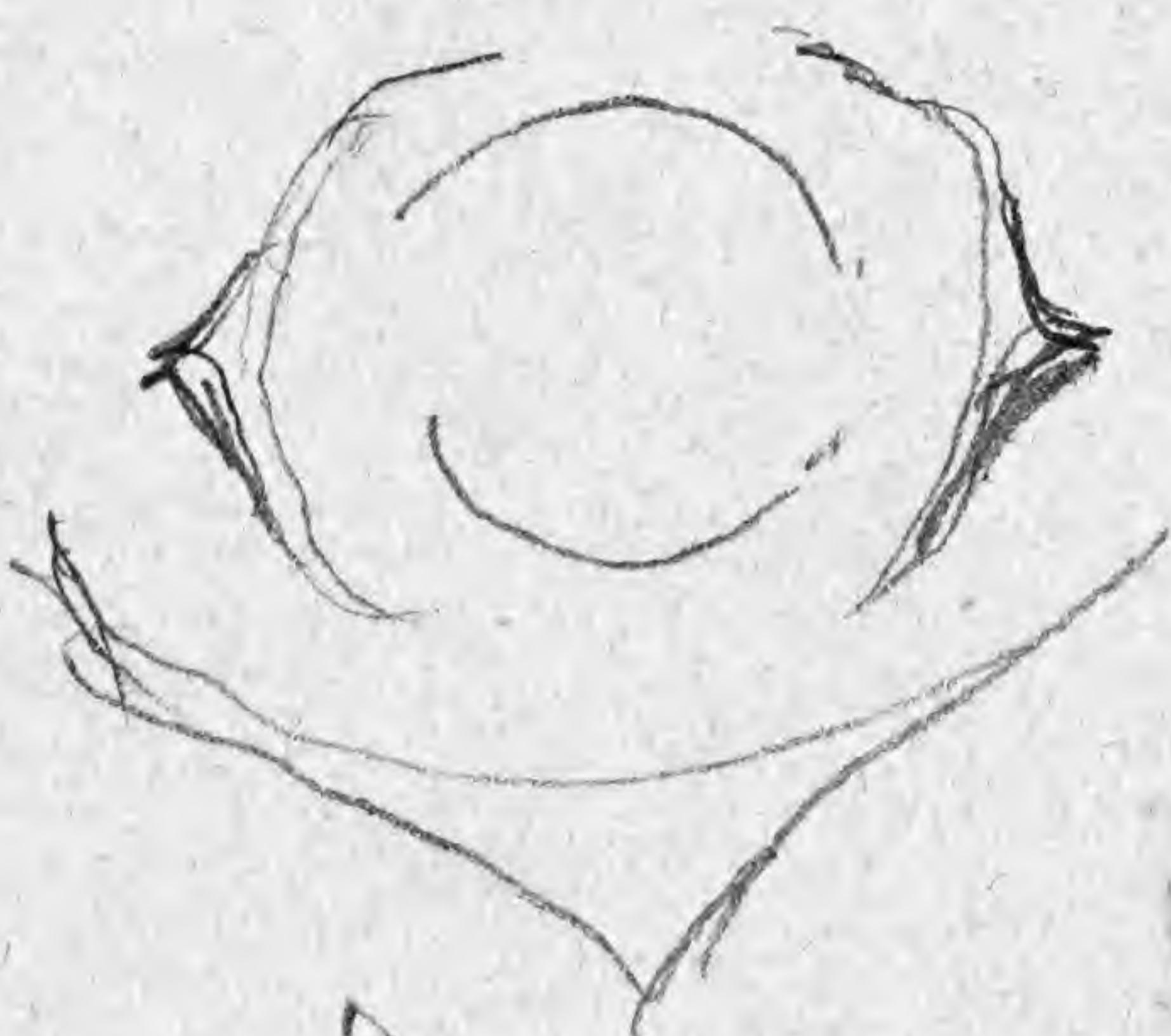
Berlin Jun 7 1858

not quite in bloom
collected in a pot - stem
1 inch diam. 6 feet high

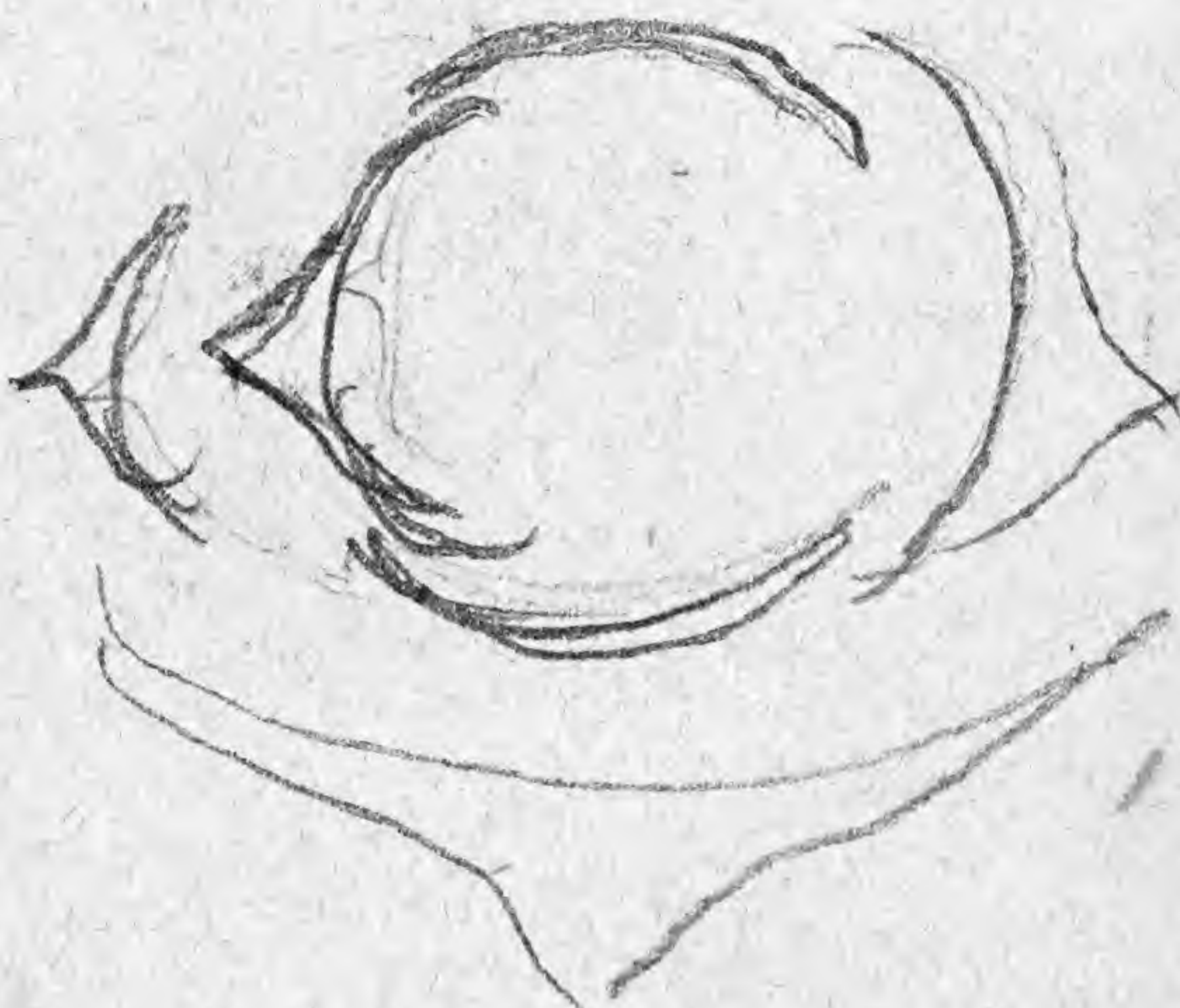
x4



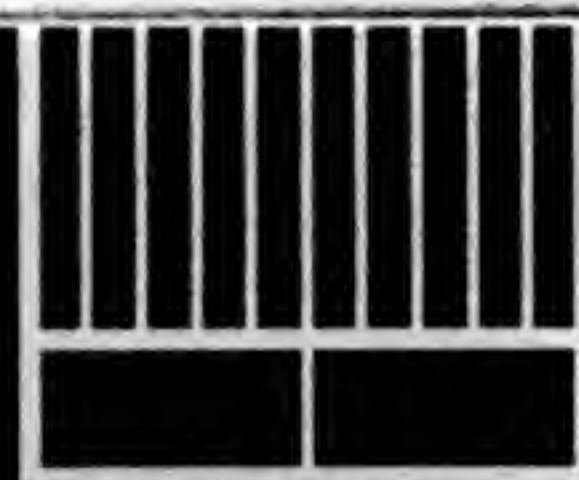
bractes persistentes
cirrinate recurvate



ordinary case



very rare



0

1

2

3

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cm

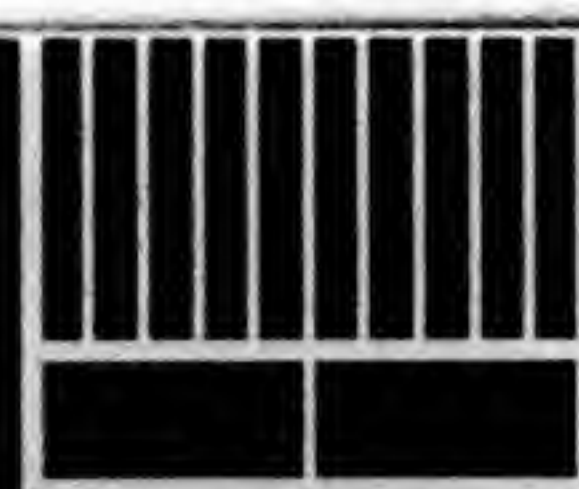
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0

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6

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8

9

10

cm

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July 11 1865

Pinus pinna

Pisa, Savi

ex hb. Casson

X4



scales of cone
patulous, or
recurved, obtuse
strongly keeled
above

similar to *Pinus*
maritima



0 1 2 3 4 5 6 7 8 9 10

cm

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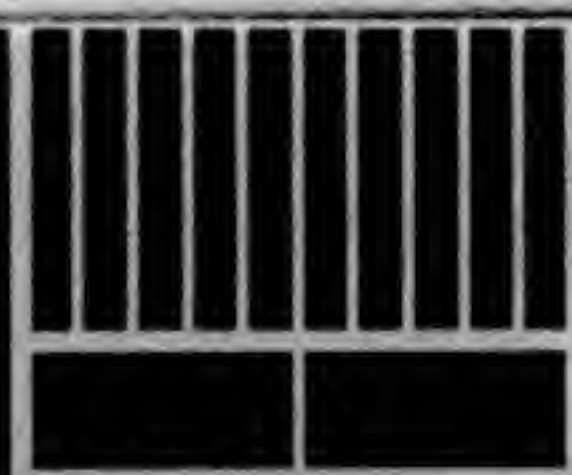


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APOTHECARY & PHARMACEUTIST
ALEX. LEITCH,
Marble Building Cor. Fourth & Olive Sts. St. Louis, Mo.



0 1 2 3 4 5 6 7 8 9 10

cm

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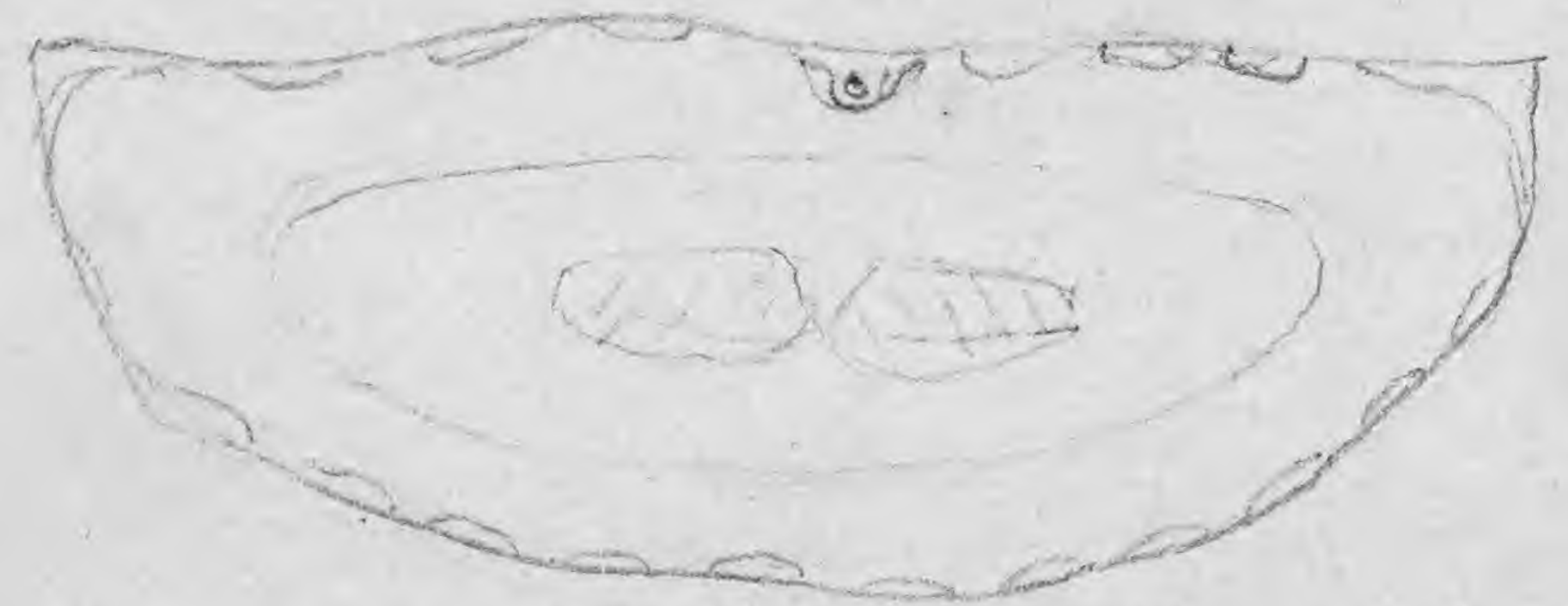
Pinus Pinea

May 5 1878

Italy

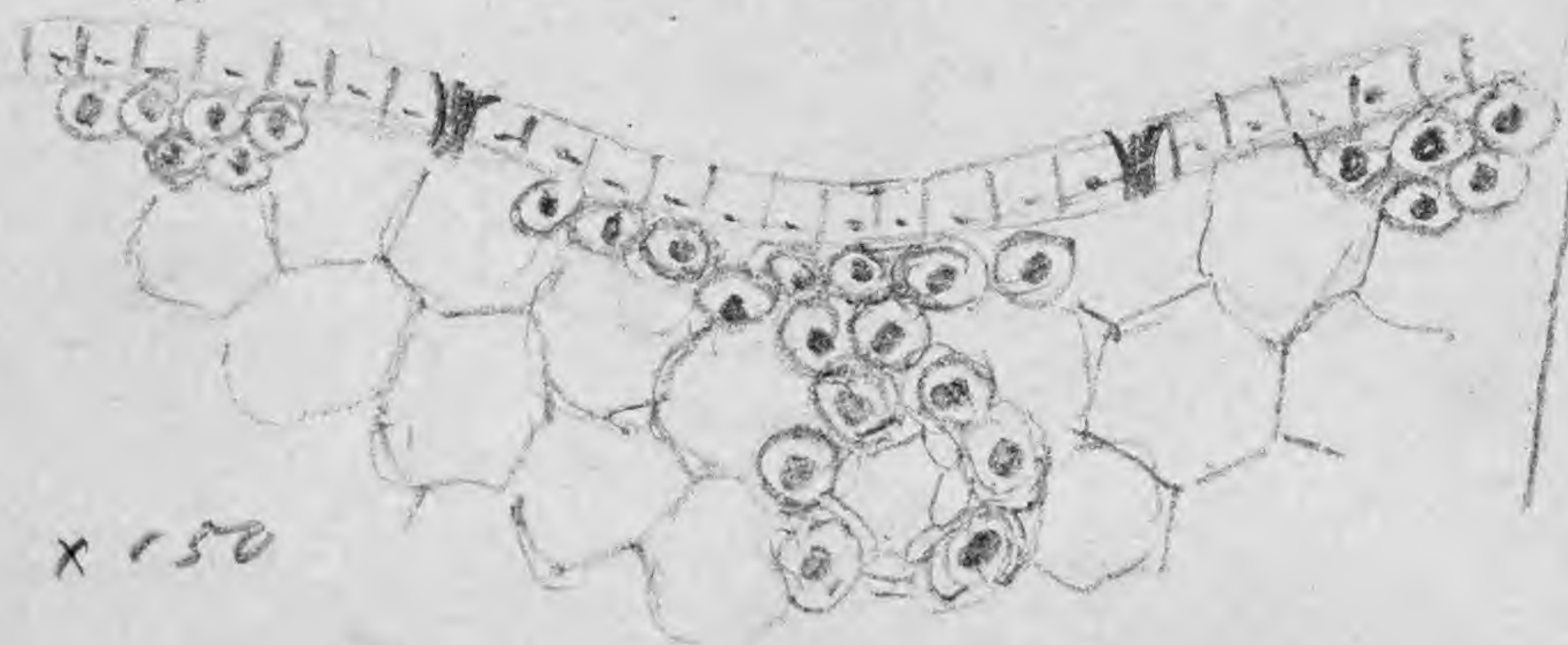
Common 2 leaved form
x 30

leaves in 3's



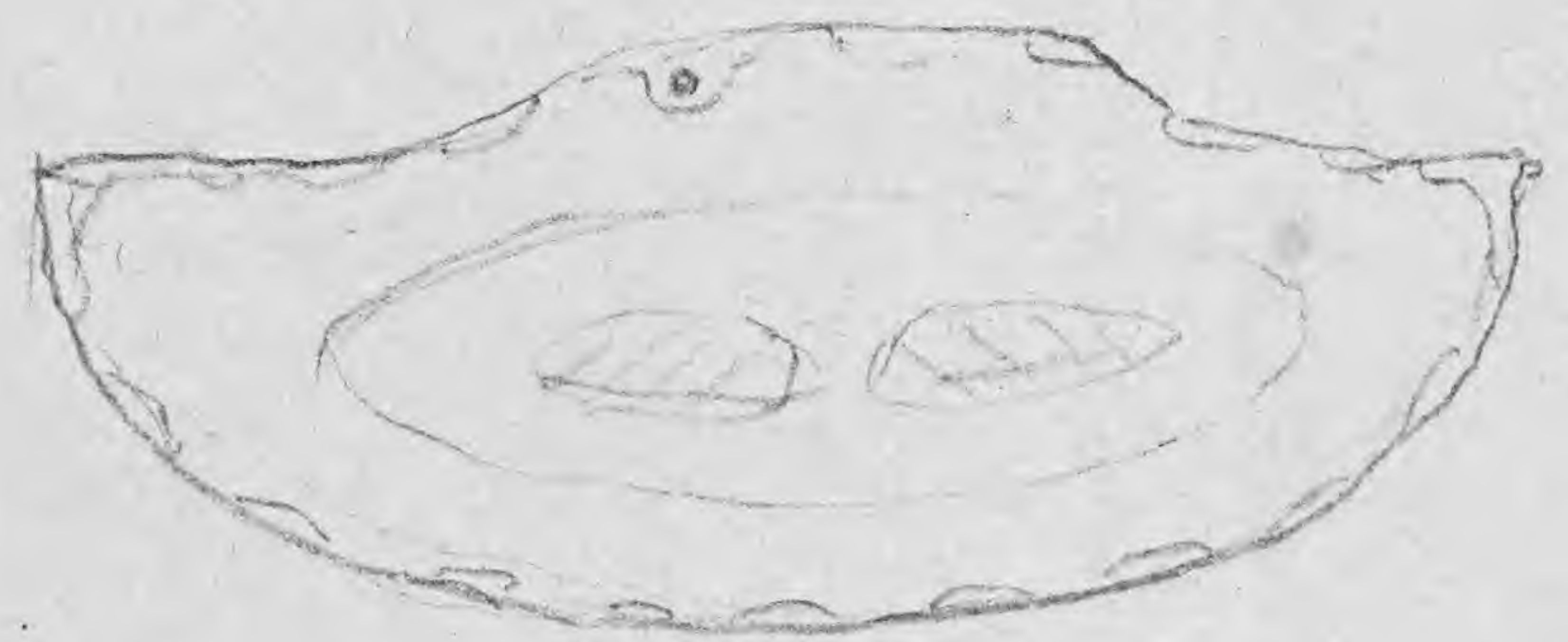
hypoderm = bundles, all around.
single marginal duct very small
surrounded by hypoderm.
no hypoderm cells in sheath

x 30



x 150

x 70



x 30

x 60



one section seen
with duct within
paraclype



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THOMAS T. ROHLFING,

APOTHECARY,

No. 2600 Laclede Ave., S. W. Cor. Jefferson Ave.,
ST. LOUIS, MO.

No. Date, 187

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Geo. Engelmann, M. D.,
No. 3003 Locust Street.

88411



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6 Feb

34

P. Halepensis

484-9



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cm

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cm

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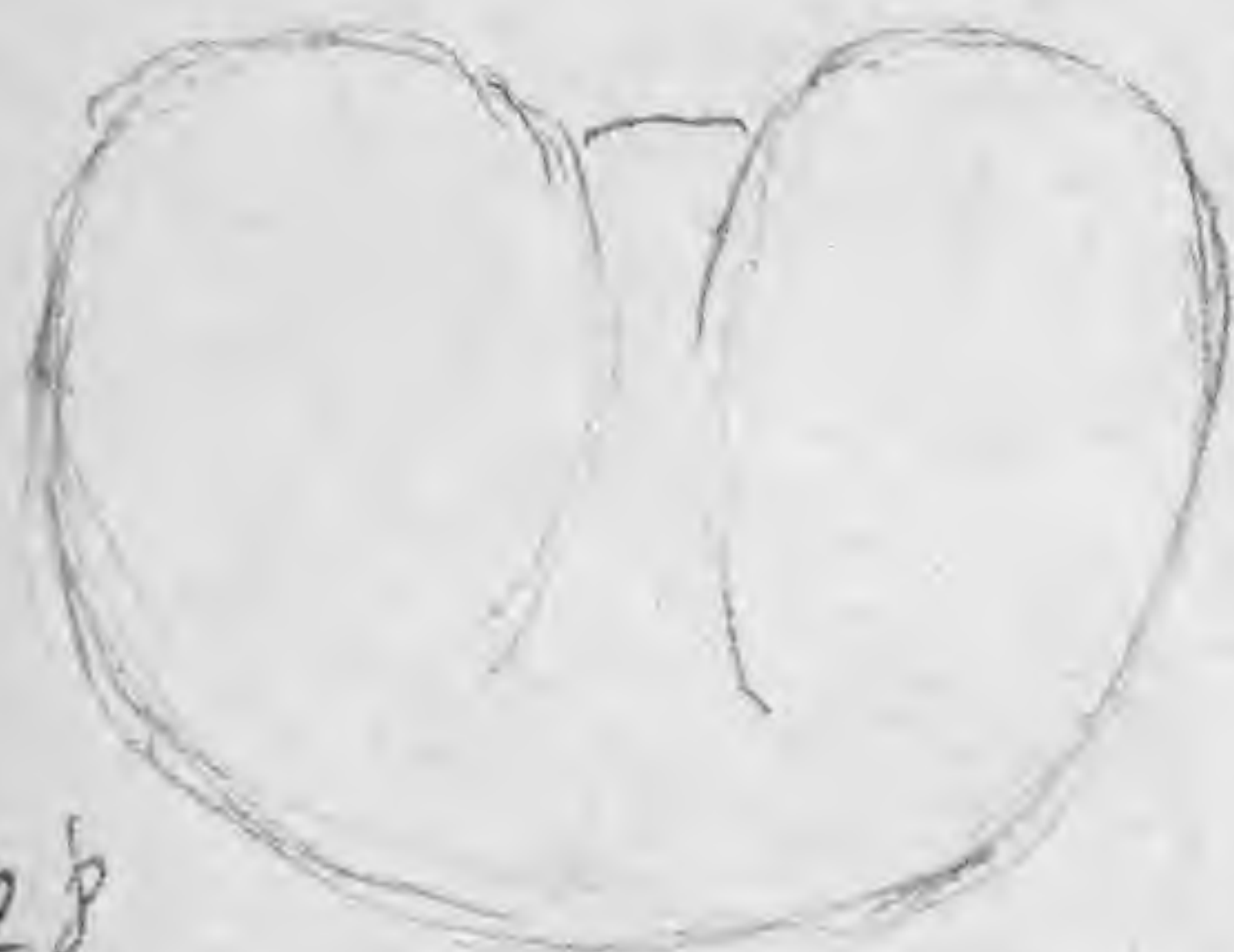


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Pinus Halepensis

Oct 4 1867

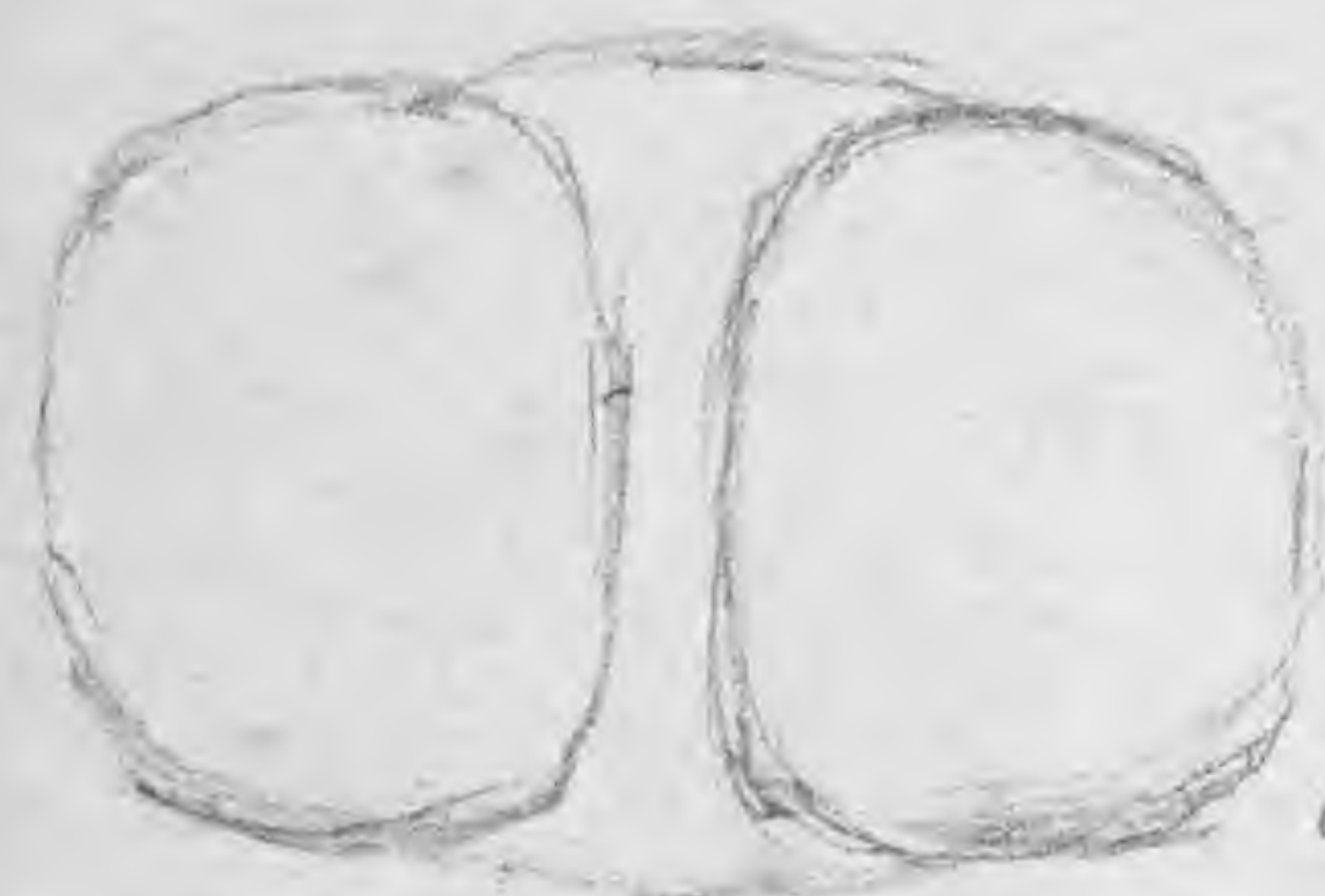
ex Herb. Bernharti HB. Mill



0.028

not sufficiently soaked?

X4



0.034



X10

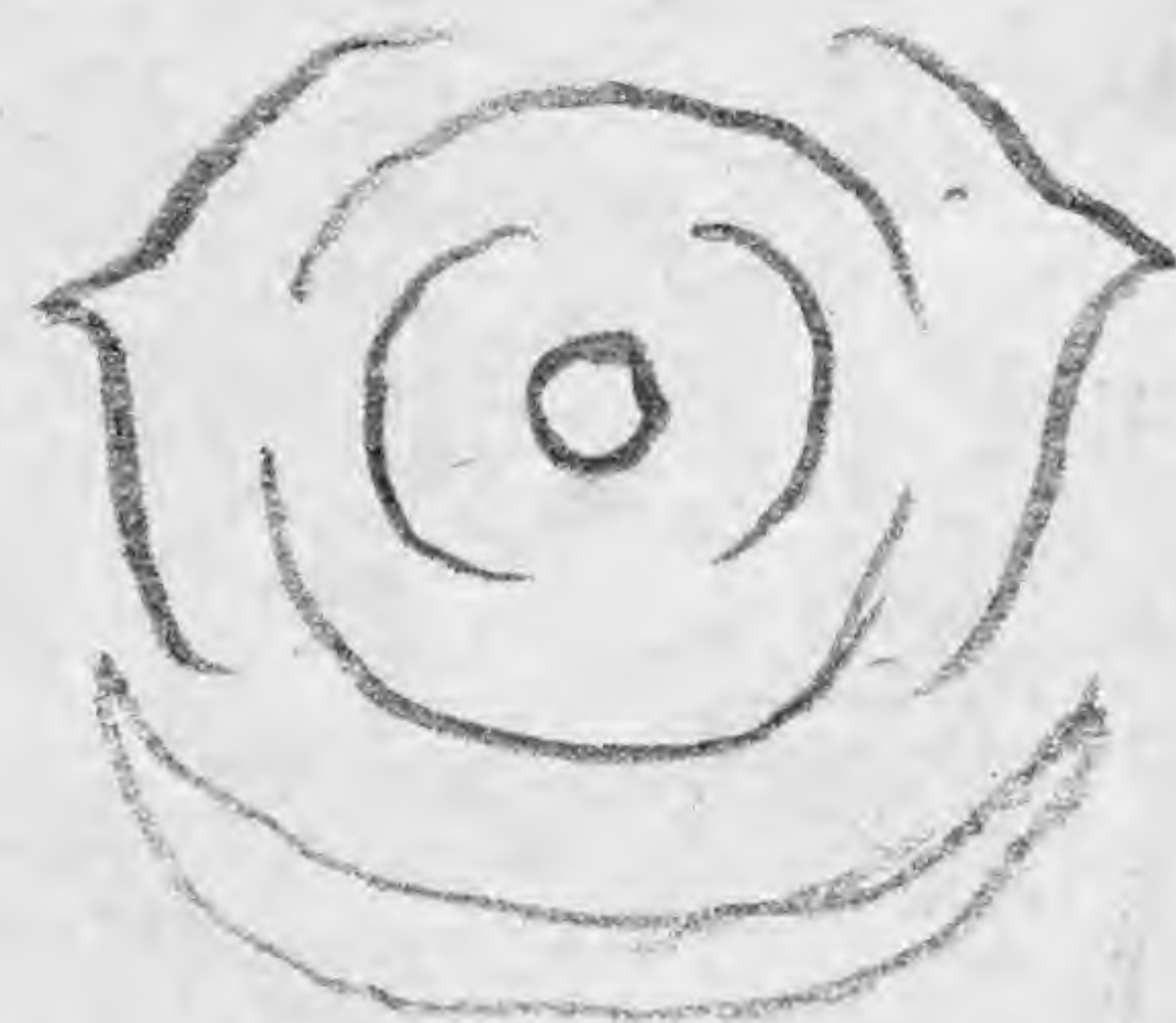


0.036



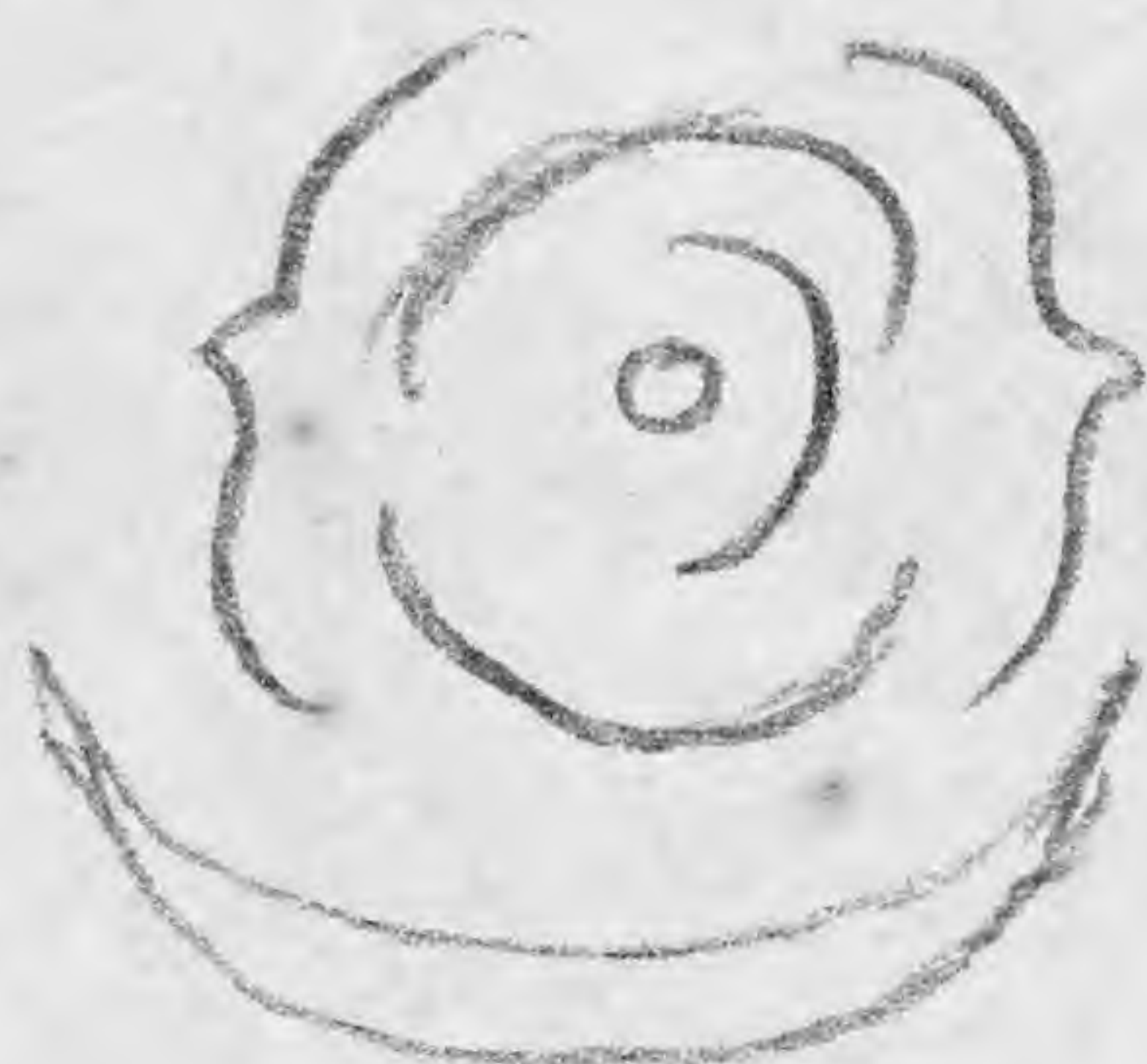
0.029

0.034 - 0.036

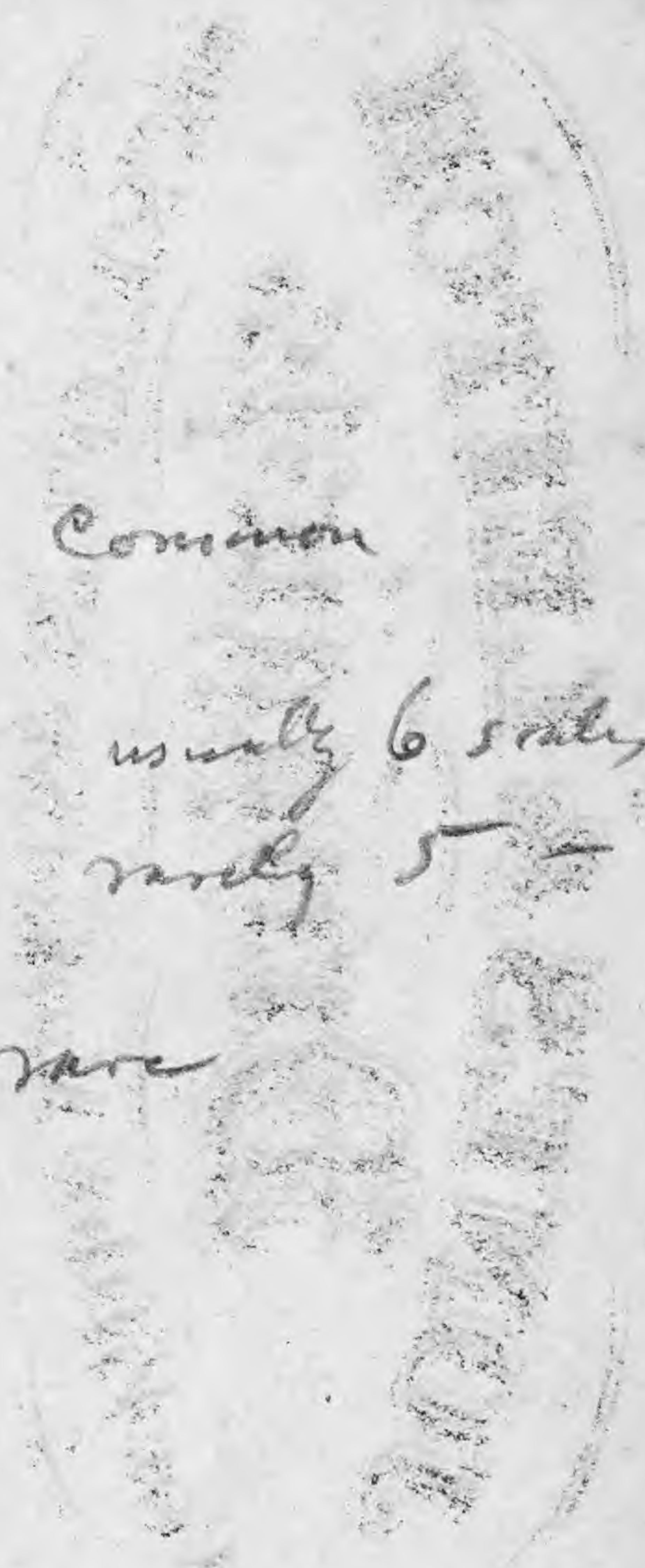


Common

usually 6 scales,
rarely 5 -



rare



0 1 2 3 4 5 6 7 8 9 10

cm

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JONES & LETTICH
Printers
Cor. Fifth & Market Sts. ST. LOUIS, MO.

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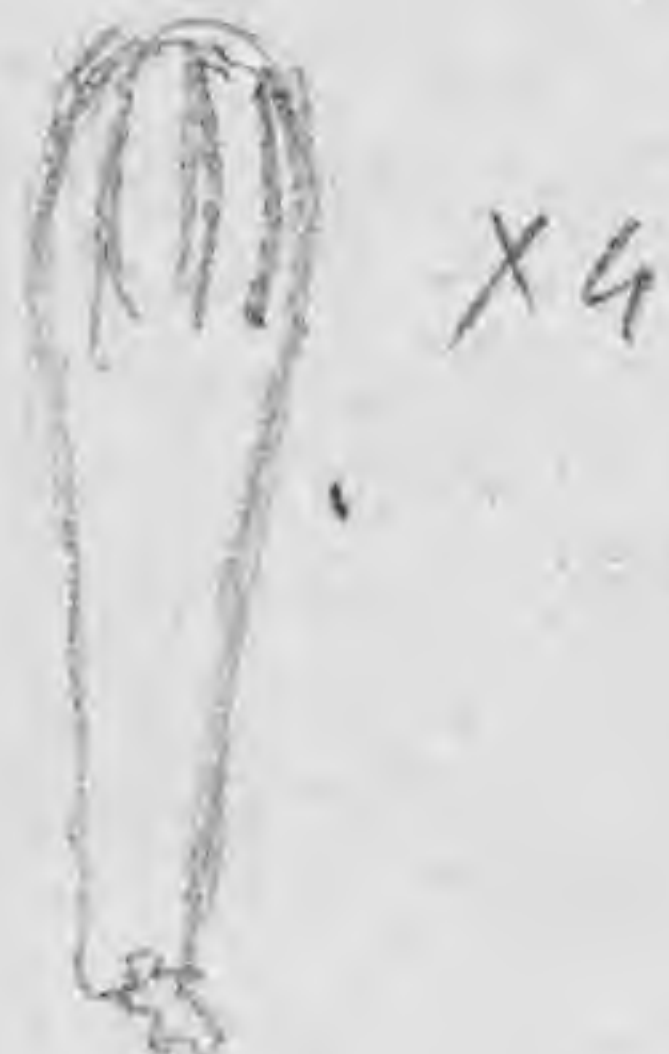
Pinus Halapensis

Octob 6 1863

Verniere 1858

9 Cotyl

6 Cotyl



albumen x4
of different sized seeds

2 seeds exam. 6

3 - - - - - 7

1 - - - - - 9 Cotyledons

x4

x10



young plant

& Cotyledons

ready 7



0 1 2 3 4 5 6 7 8 9 10

cm

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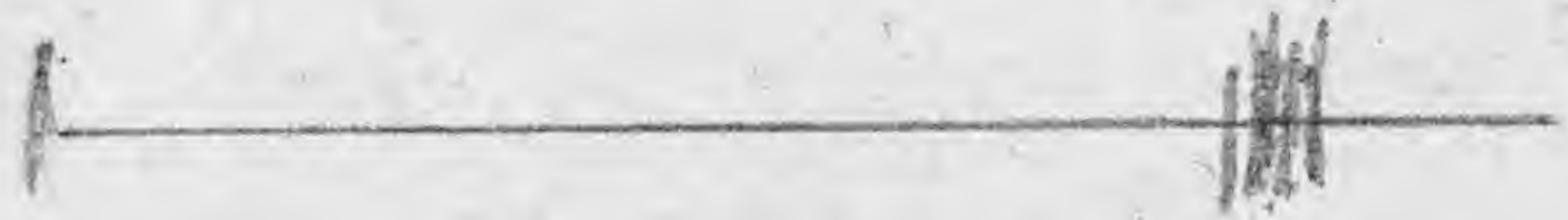


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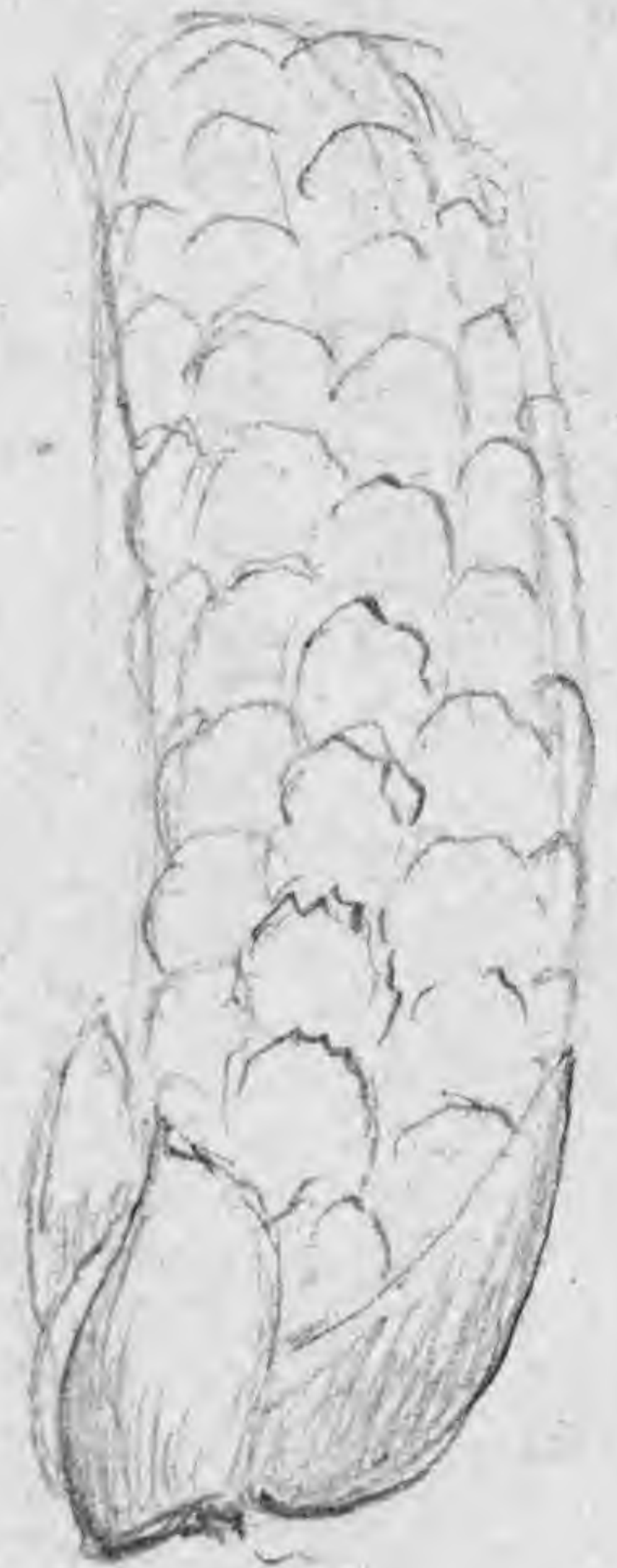
wet
size of Pollen x 415

Pinus Halapensis
Algiers, Cosson Jan 6 1852

June 21 1864



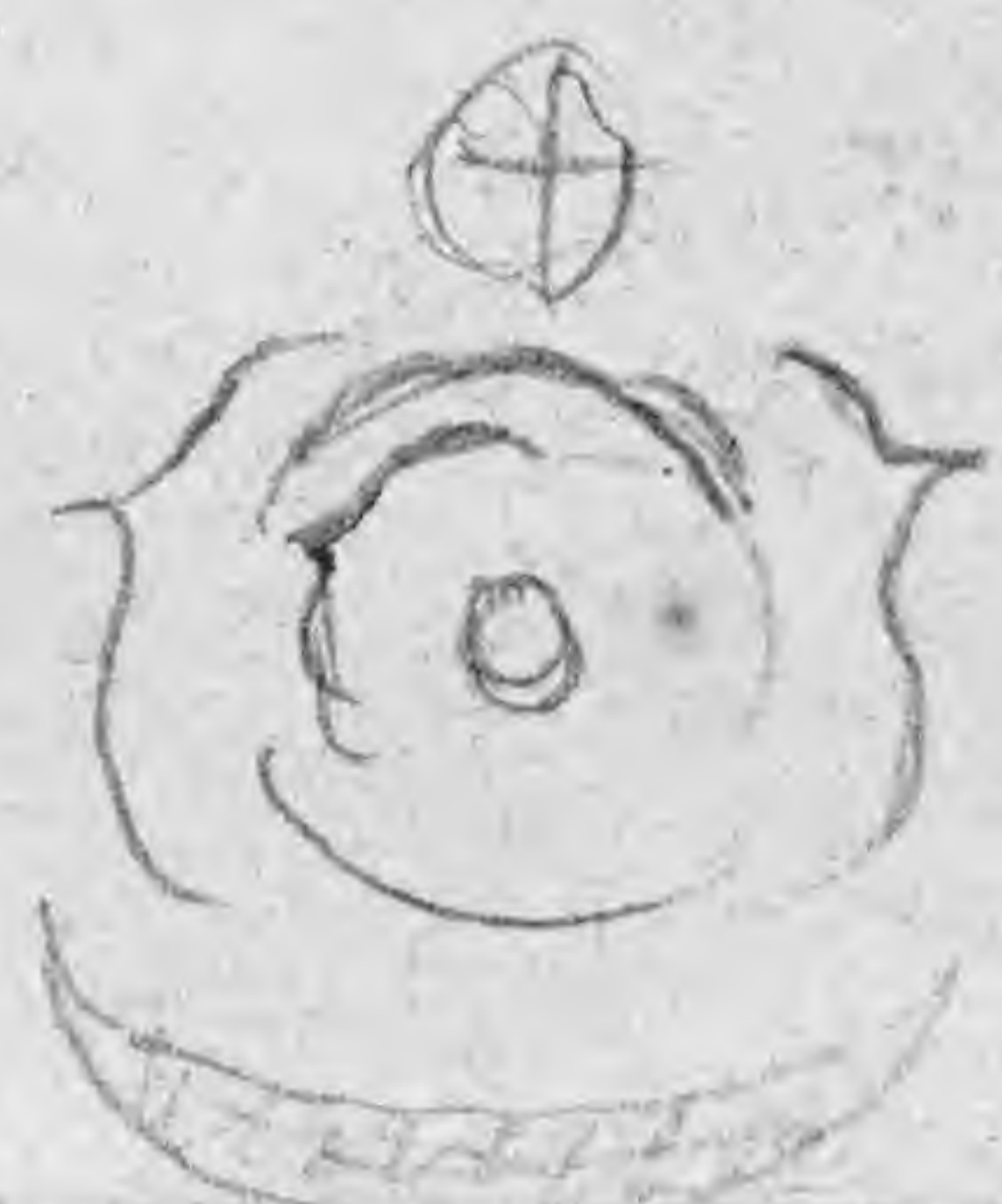
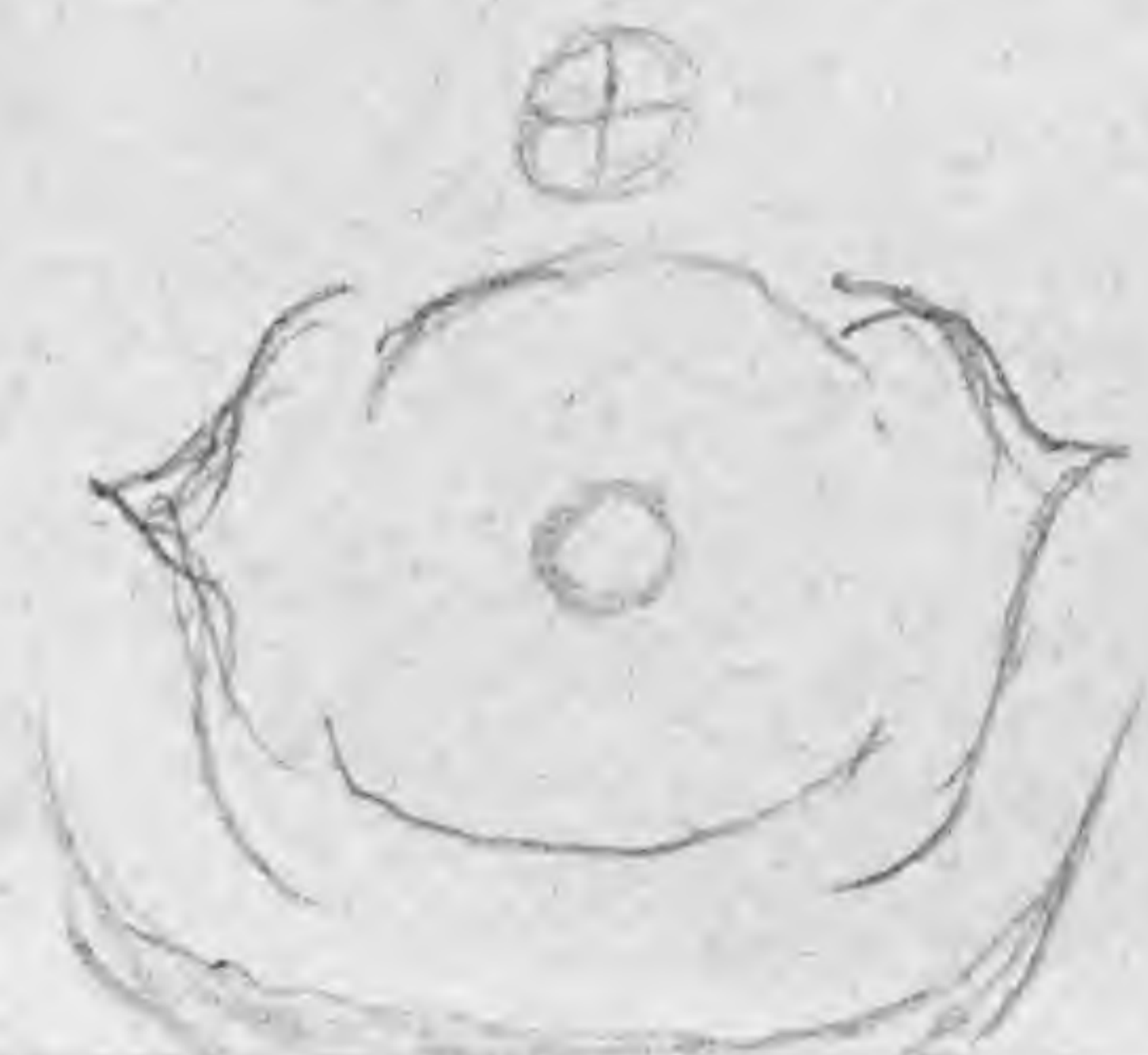
0.037 - 0.040 lines
0.090 - 0.096 millim



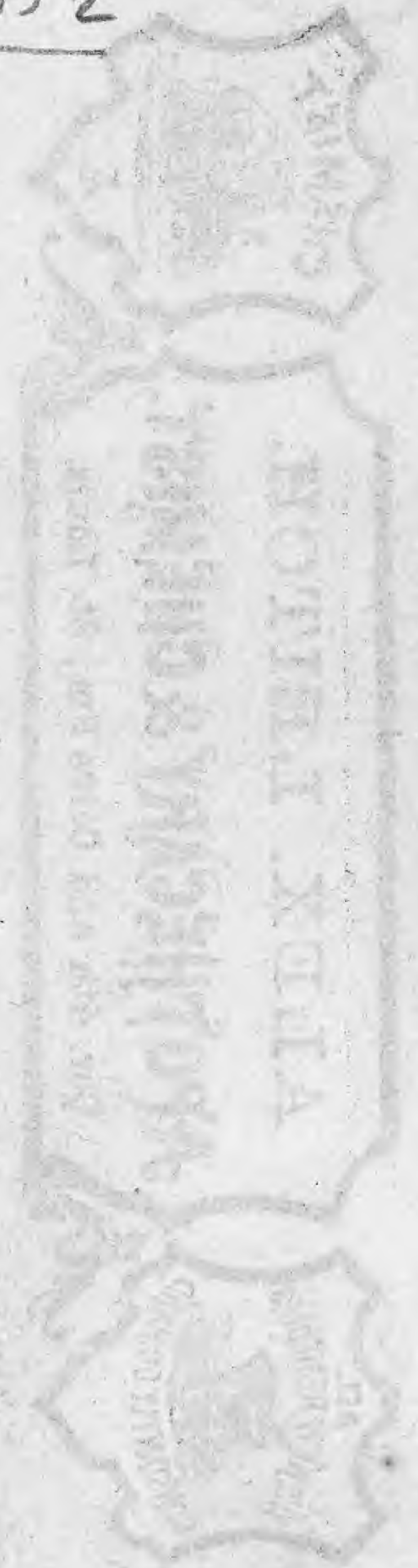
x 4



x 10



4 or 5 scales



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cm

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ALEX. LEITCH,

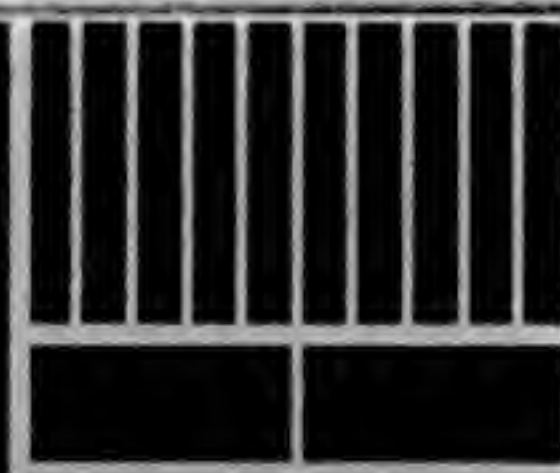
APOTHECARY & CHEMIST,

Cor. 4th and Olive Sts., St. Louis.



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1492



0 1 2 3 4 5 6 7 8 9 10

cm

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32

33

tub 5 P. Bunzlana

tub 3 P. Gerardiana

475-483



0 1 2 3 4 5 6 7 8 9 10

cm

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cm

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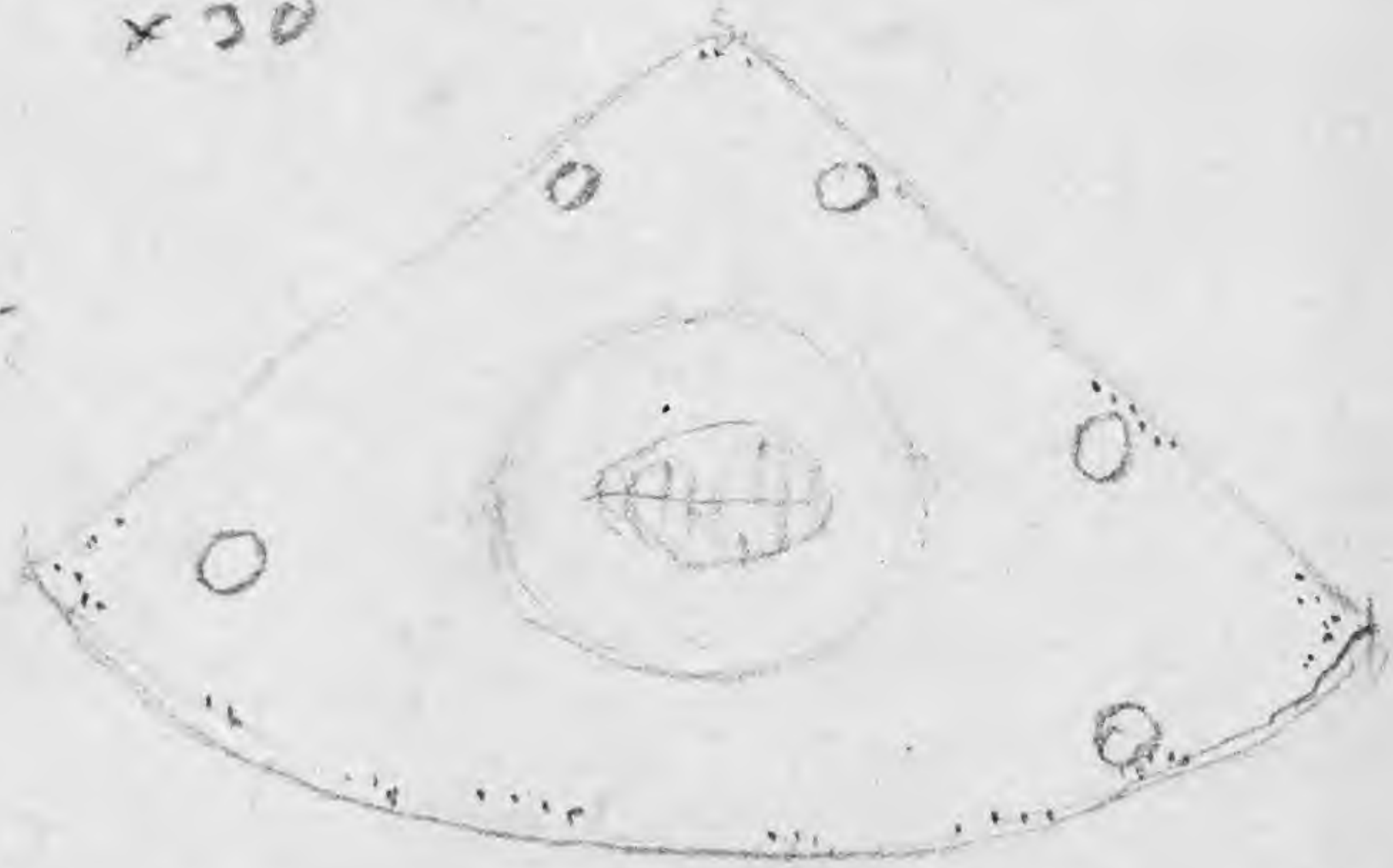
MISSOURI
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Leaf 1.5 mm wide Pinus Bungeana Zucc

May 5 1878

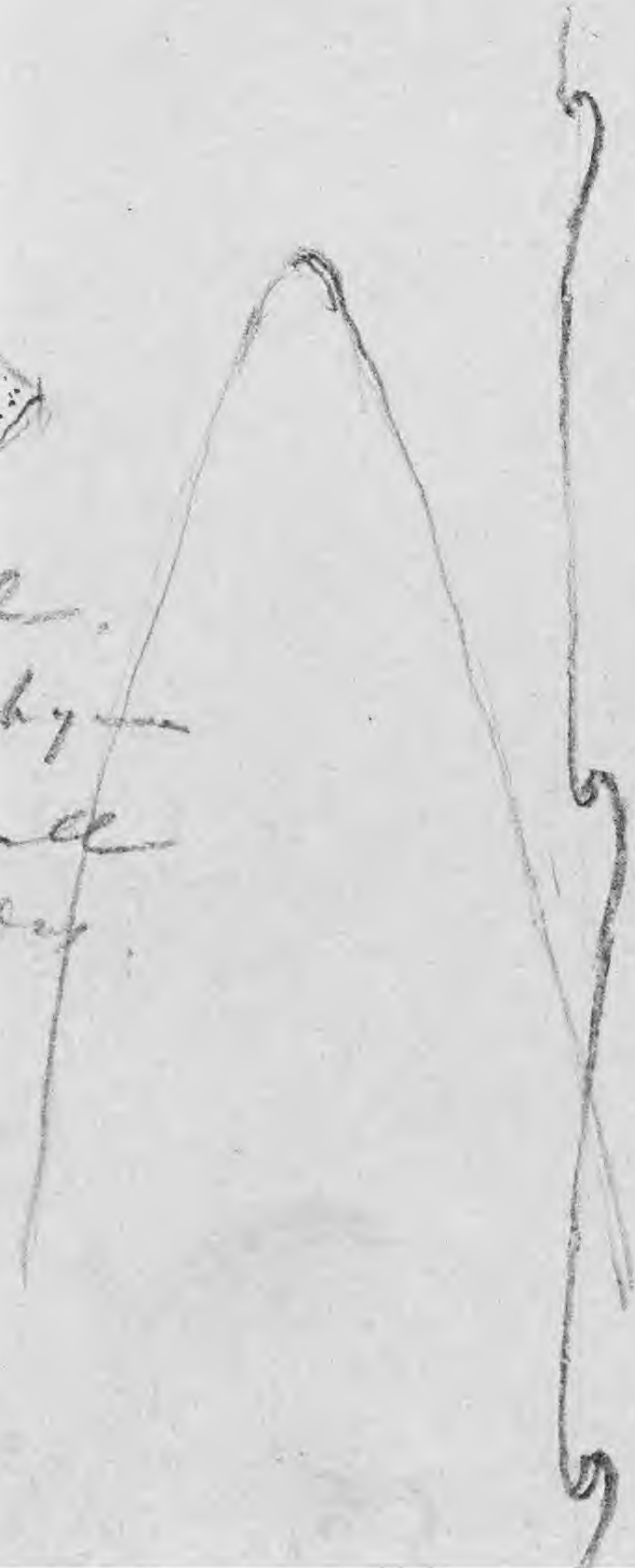
Bunge leg - China borealis

x 30



Stomata mostly marginal,
but also in parenchyma
hypodermis cells in small
bundles on all sides
and in corners

x 60



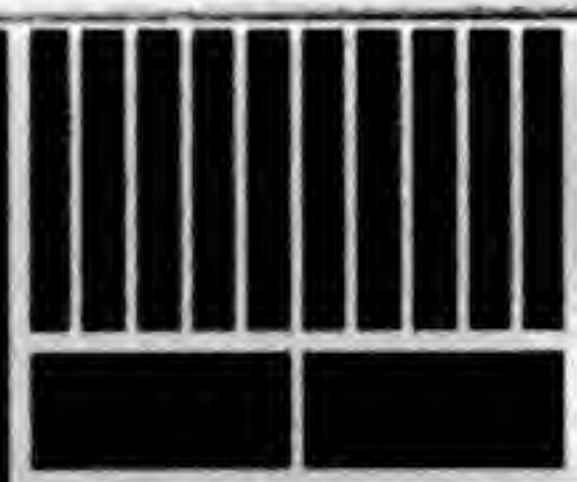
Teeth foliis terminis
marginibus levibus Endl

Endl. p. 166
Pursh p. 348 only copies
Earl. Herb. Murr.

teeth remarkably thick
somewhat incurved



seed, Hb. Herbarium
New York
supposed to belong here



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cm

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APOTHECARY,

No. 2600 Laclede Ave., S. W. Cor. Jefferson Ave.,
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No. Date, 187

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Hb 411



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May 24 1878

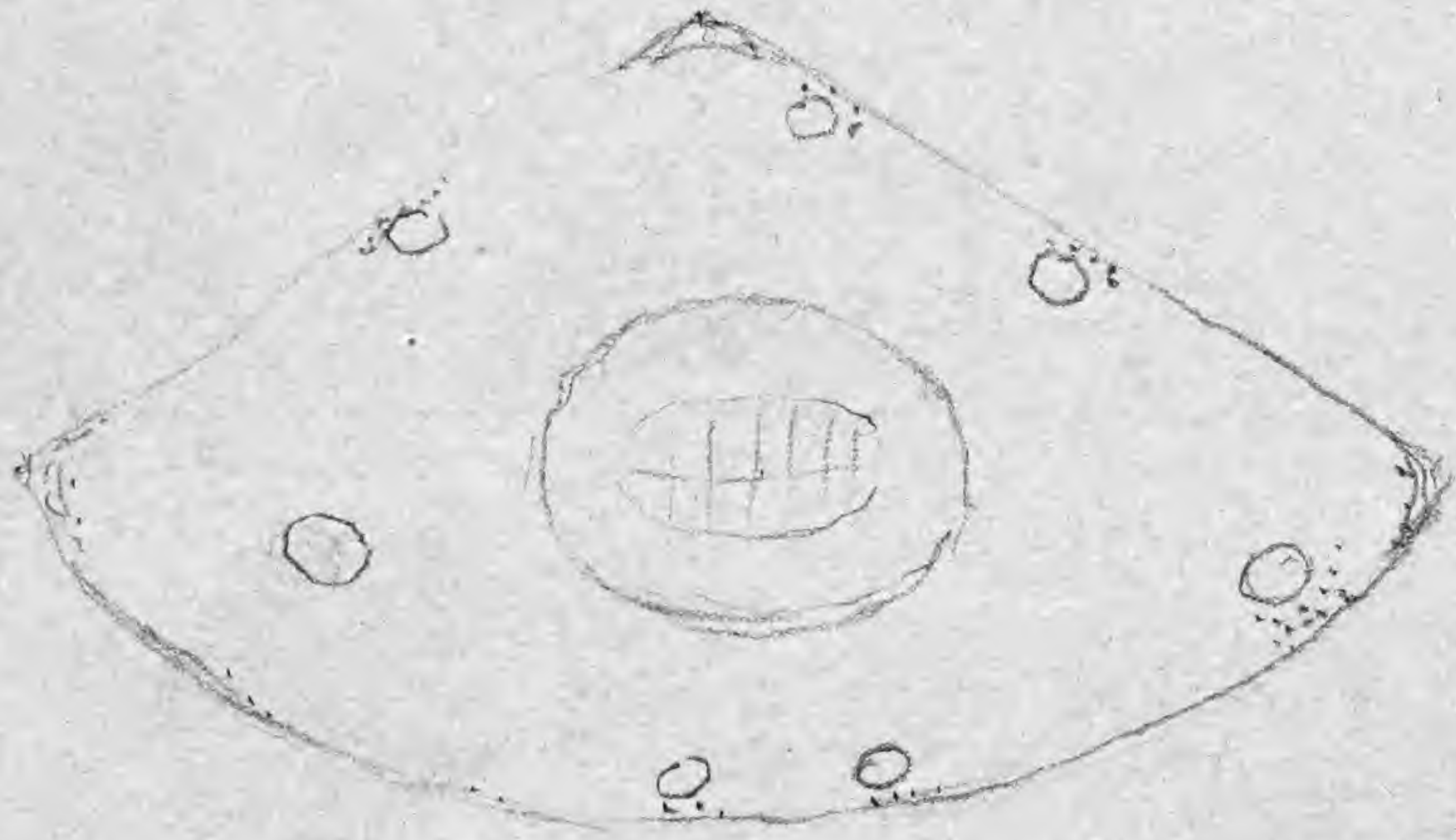
Pinn. Burmann

leaf 1.8 mm wide

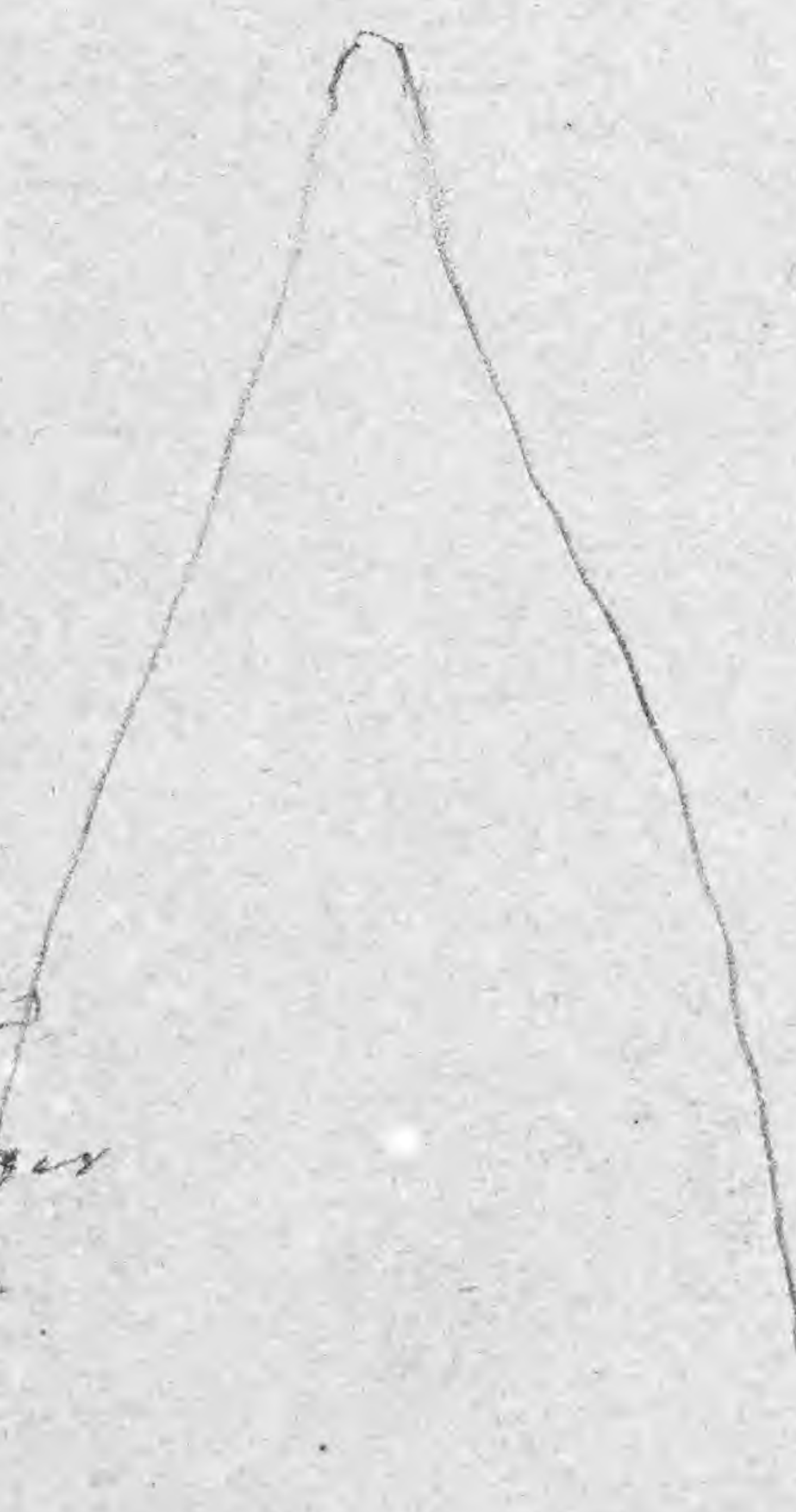
cult. China, Fortune - Coll

Brit. Mus

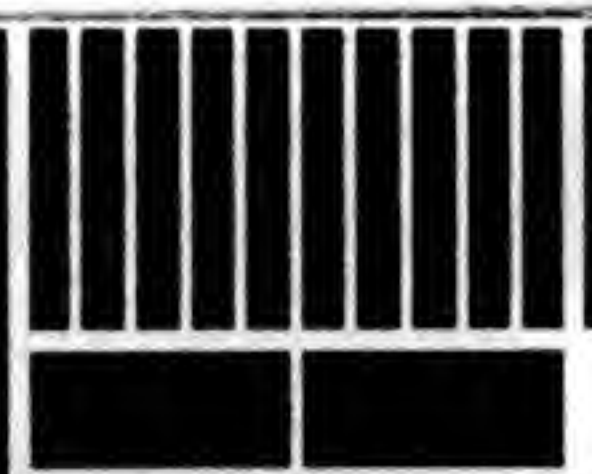
x 30



largest duct parenchymatous, lateral
 others, oft 6, peripheral, separate
 from epidermis by hypoderm cell - layer
 wood bundle almost single, oval



x 60



0 1 2 3 4 5 6 7 8 9 10

cm

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No.
1006 Olive
Street.

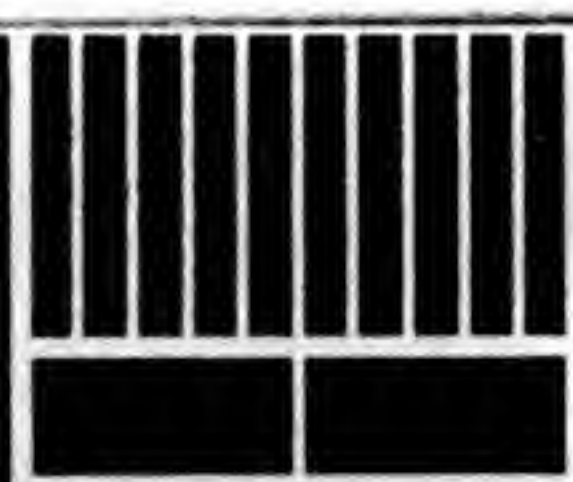


PURE WINES AND LIQUORS FOR MEDICAL USE.

Cor. 5th
and
Walnut St

MISS JURI BOTANICAL GARDEN
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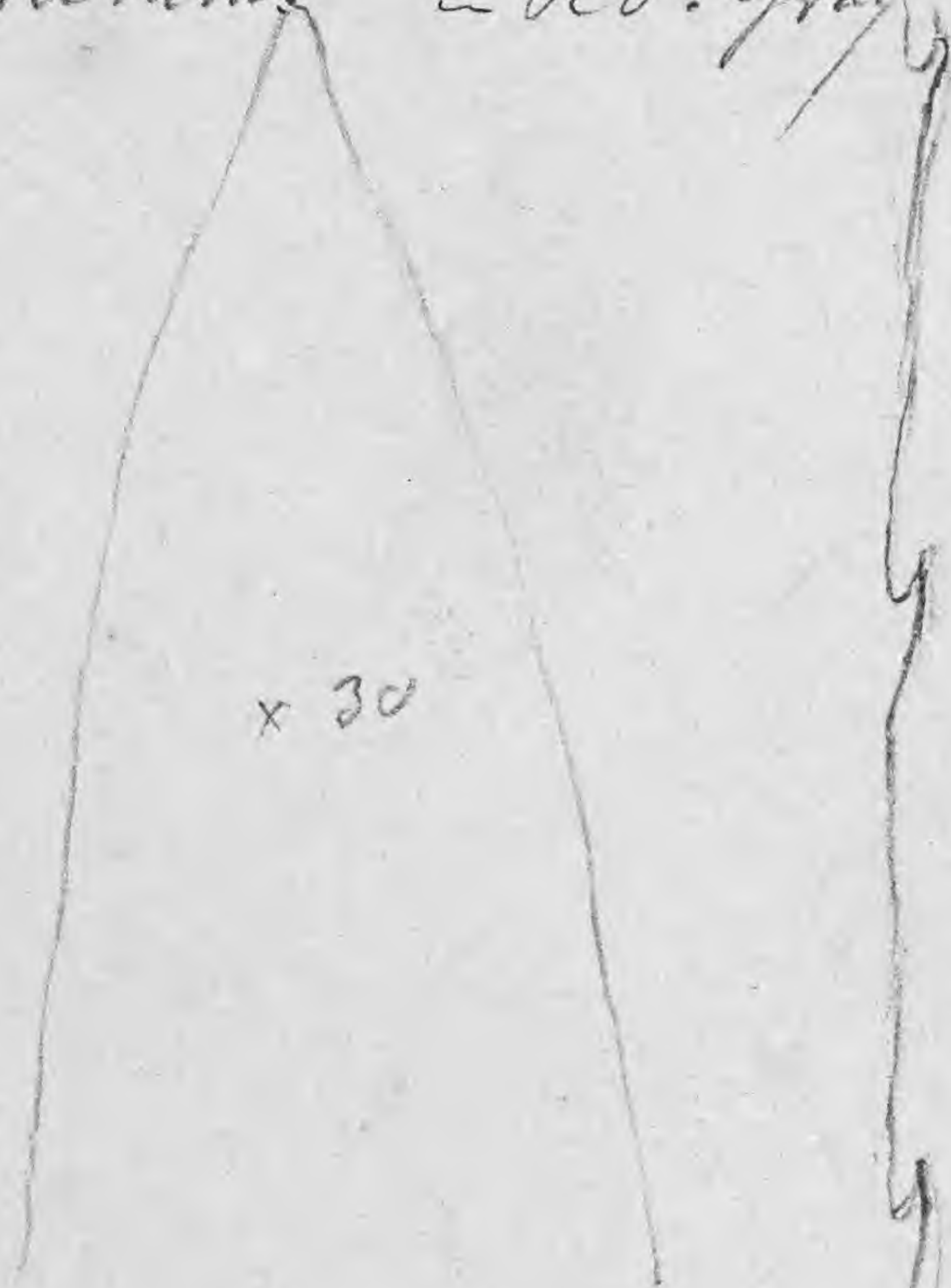
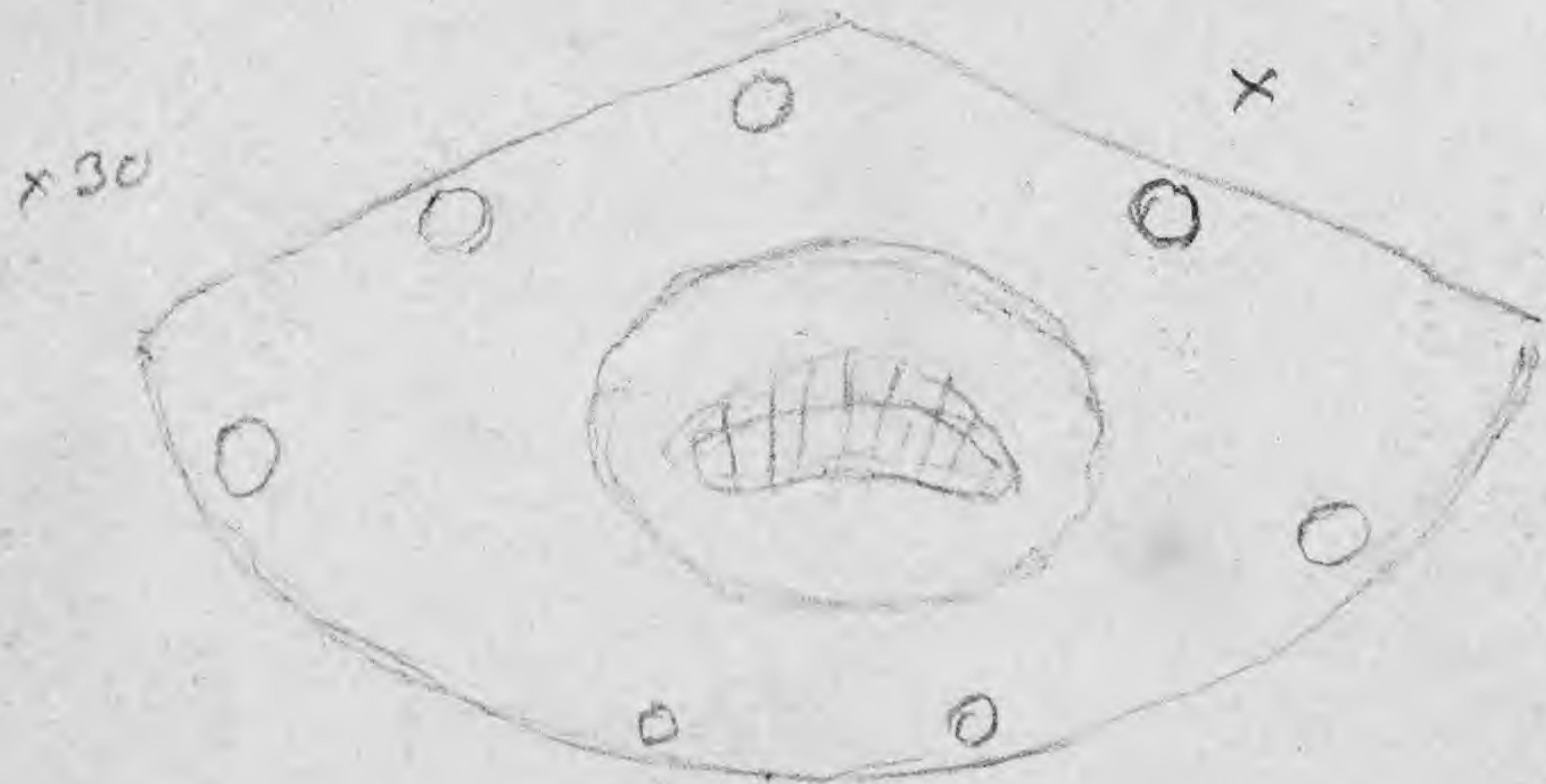


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P. Bungeana

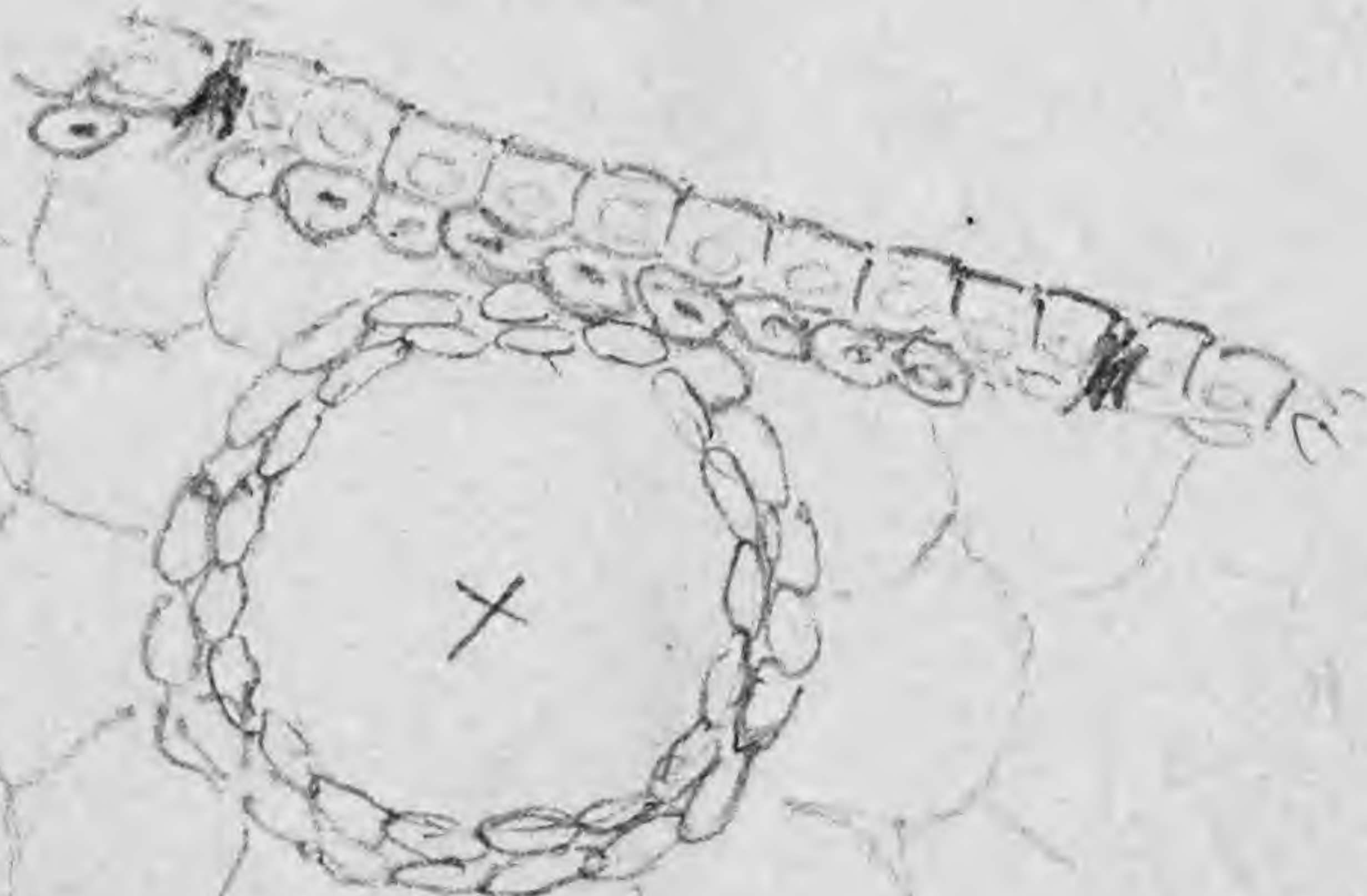
June 10, 78

Peking, S.W. Williams in Herb. Gray



x 60

x 150



0 1 2 3 4 5 6 7 8 9 10

cm

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9641



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June 17 1878

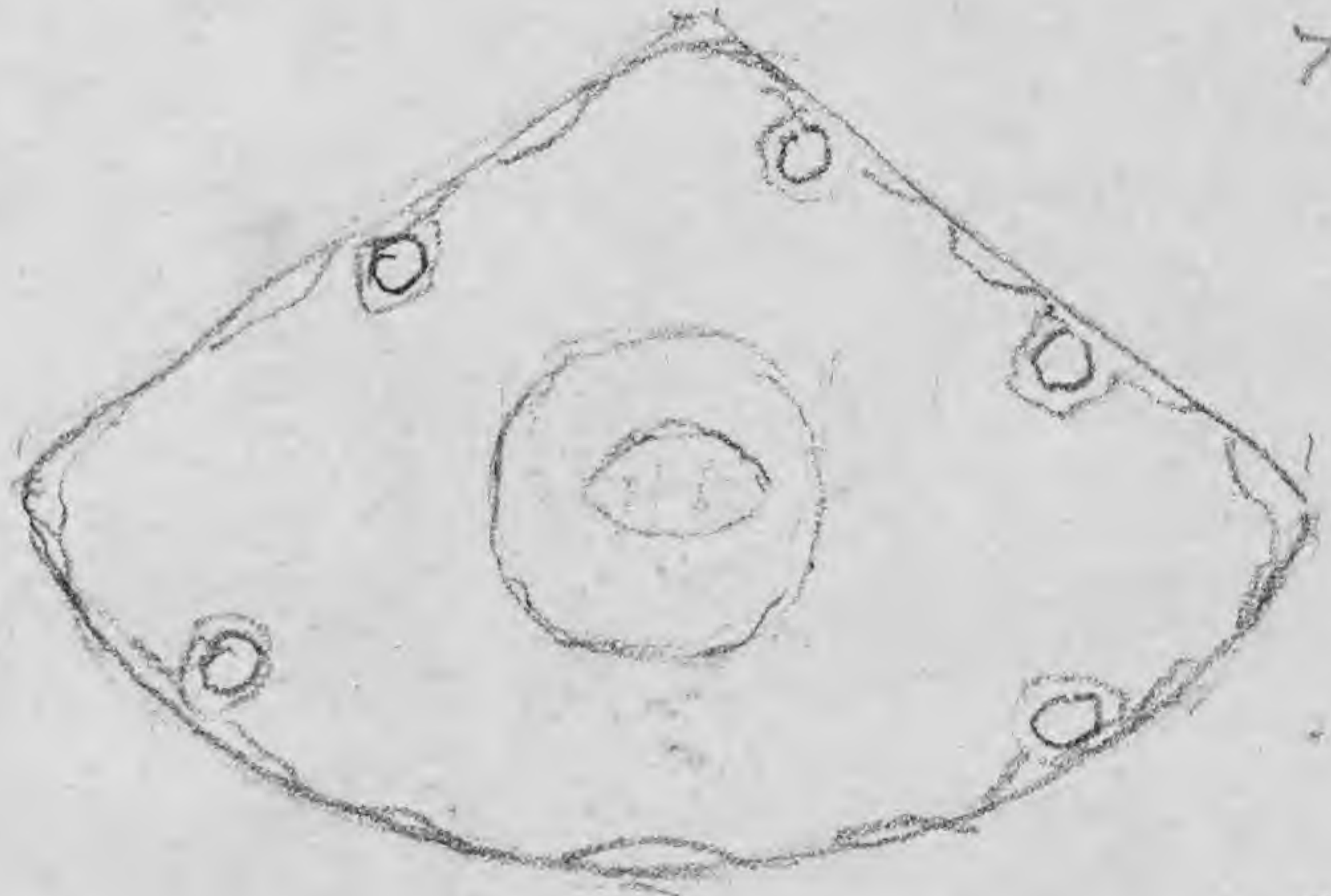
Pinus Bungeana

Hort. Bot. Missouri - fresh

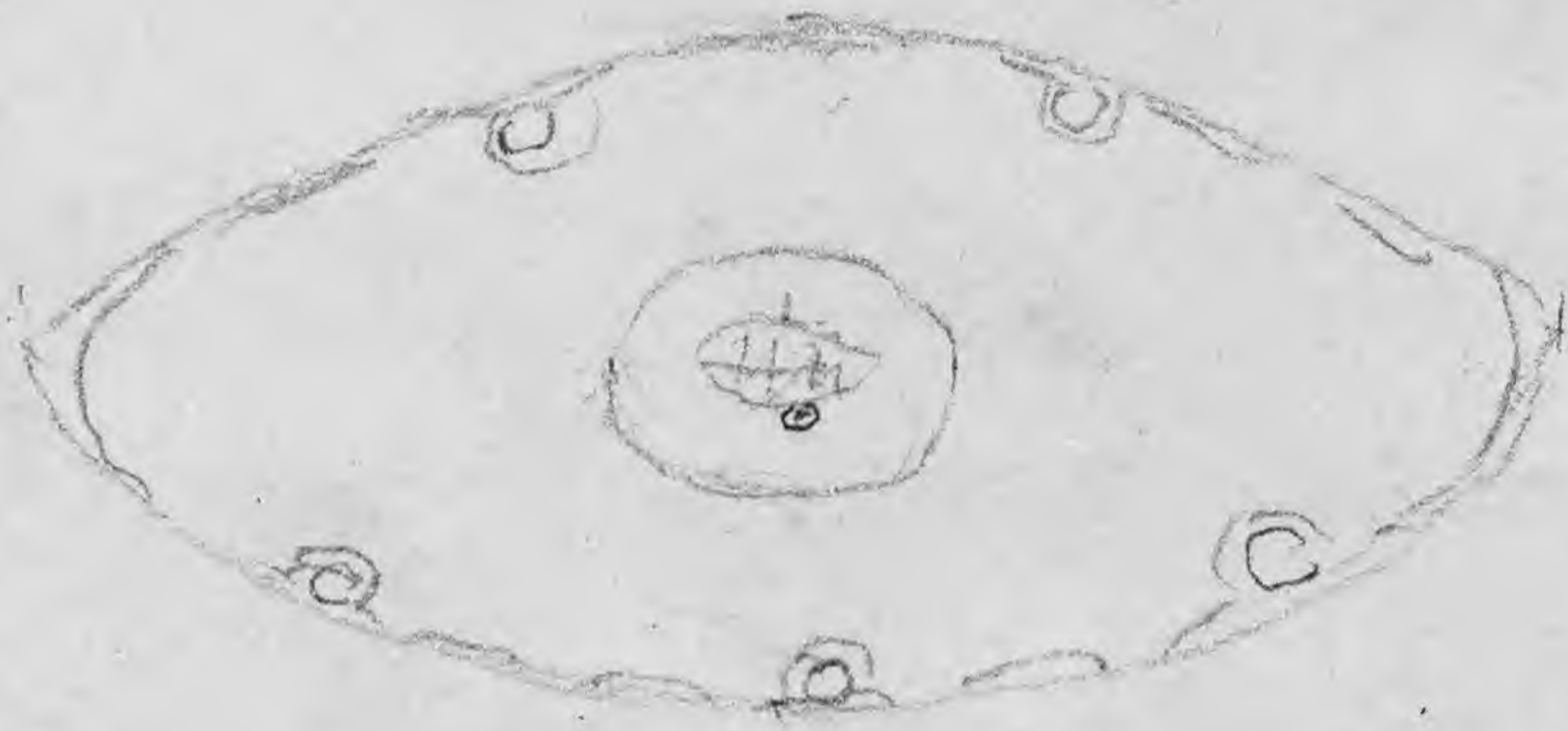
x30

2x5-6 series of stomata

7-8 below



leaves
of same bundle



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GEORGE ENGELMANN PAPERS
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cm

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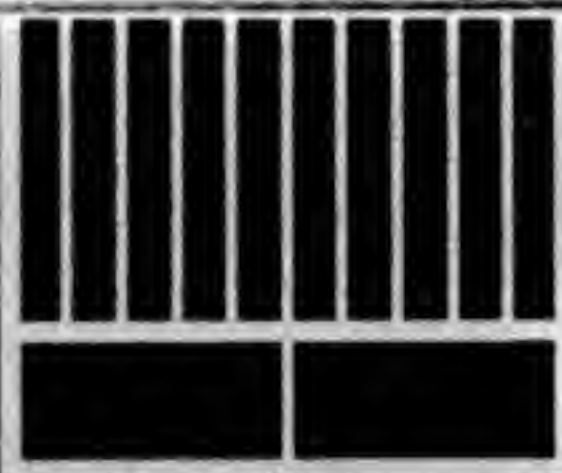
Leitch & Corlies

DRUGGISTS

South West
Corner Fifth
and Market
Streets.

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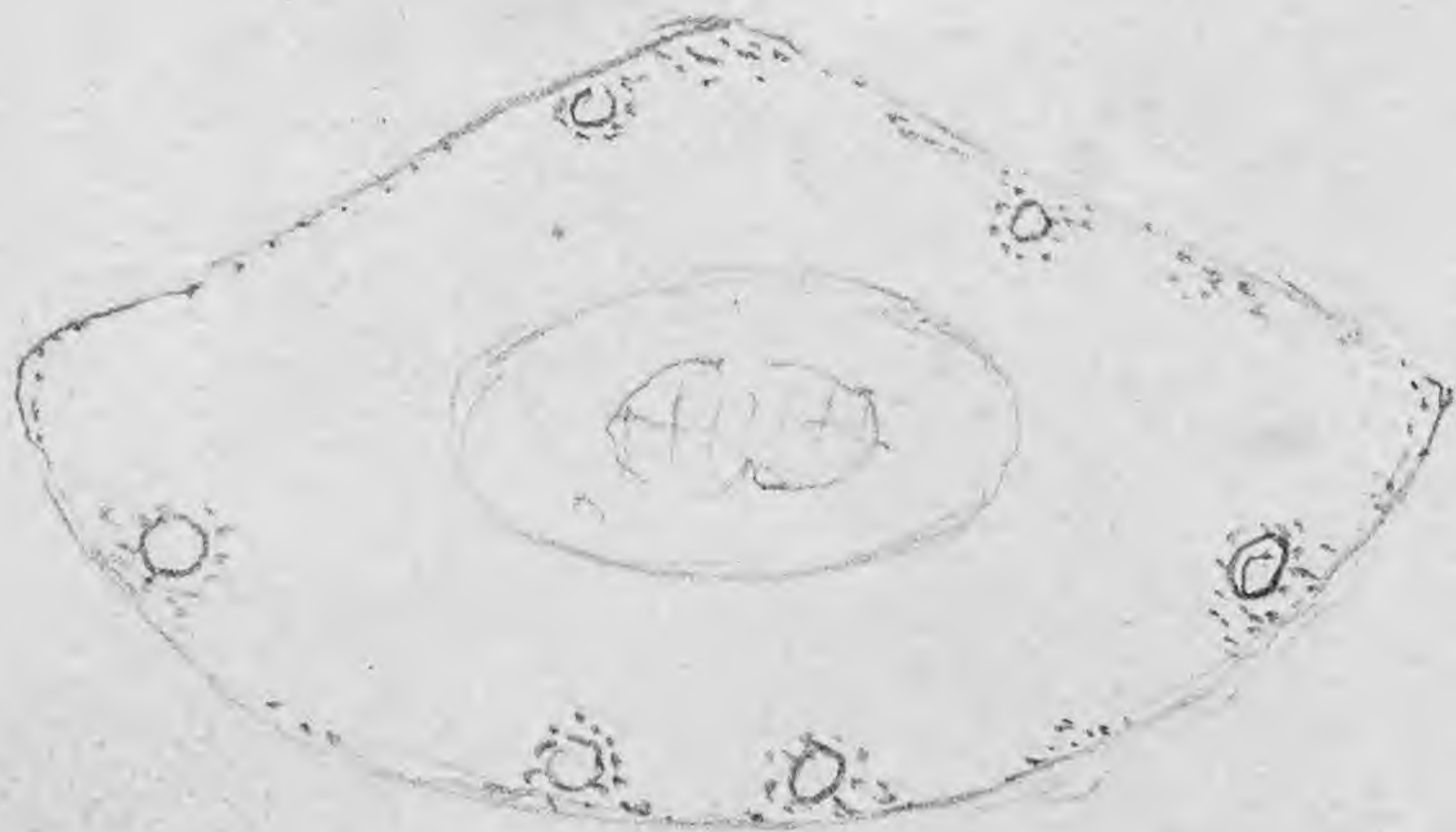


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Pinus Guardiana
India, Thompson

May 12 1879
(ex Hb Kew)

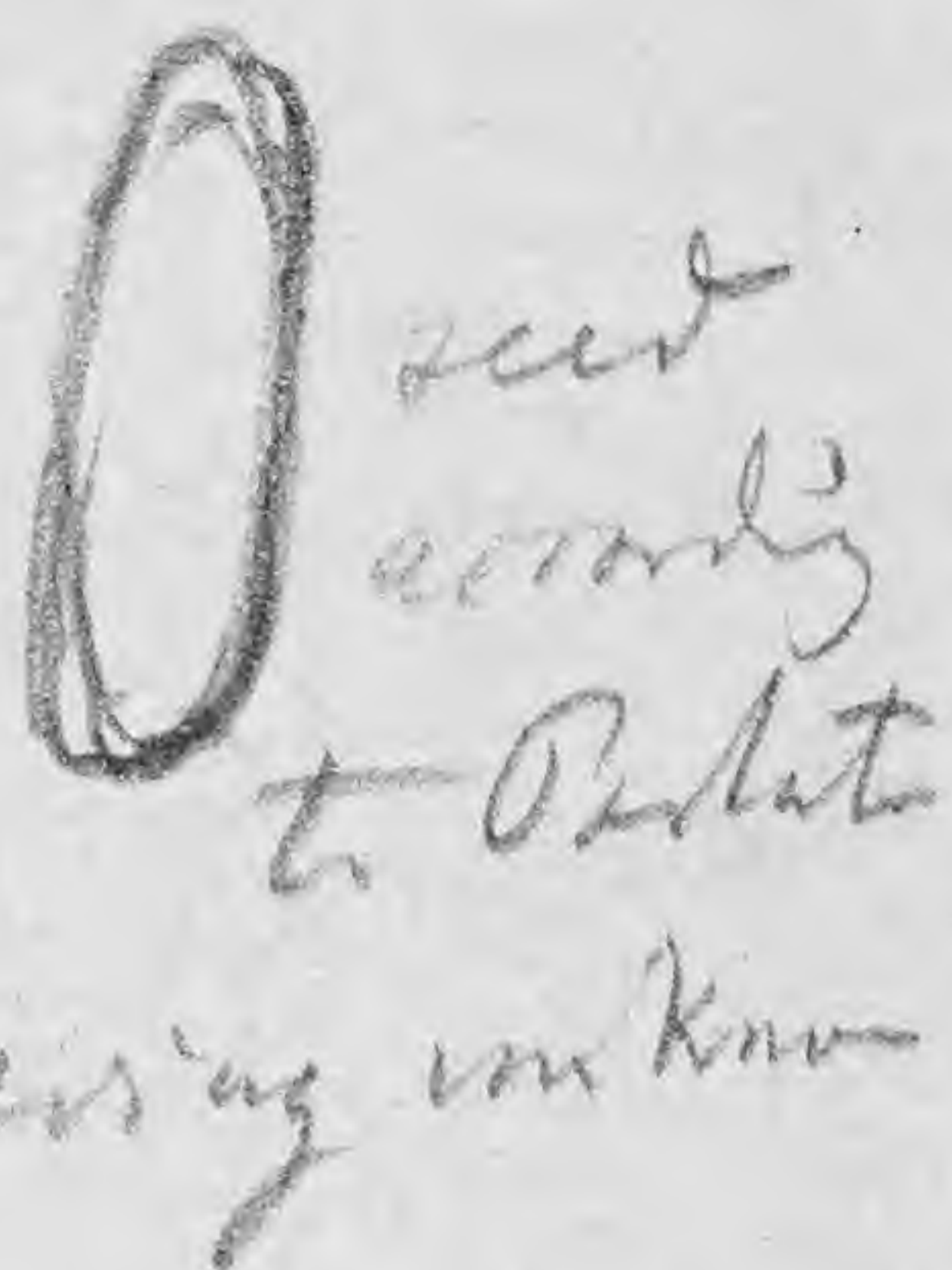
x 30



periph. ducts, mostly on lower
side, smaller and fewer
irregularly above surrounded
by hypoderm - likewise hypoderm
scarce - none in sheath, where
bundles of vessels not separated



x 30

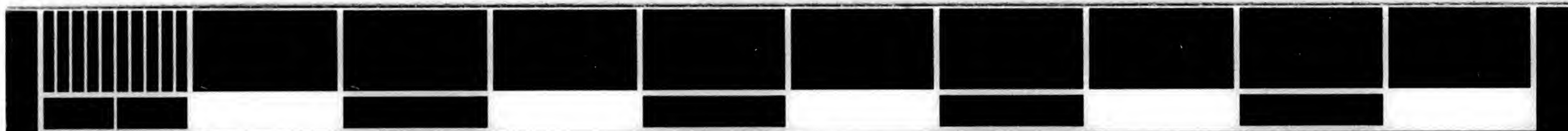


seed
according
to Lambert
drawing in Kew



Lambert's
figure

x 60



0 1 2 3 4 5 6 7 8 9 10

cm

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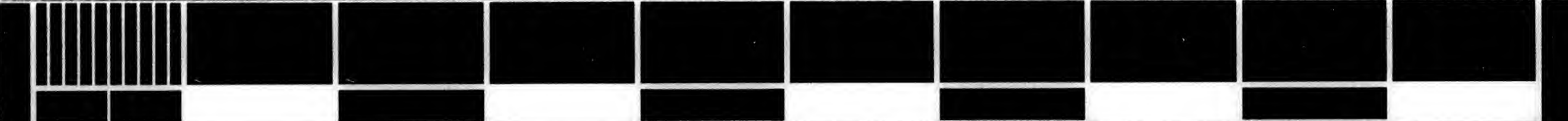
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86411



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Pinus Gerardiana

Nov 9 1879

Indian cone, obtained from the British

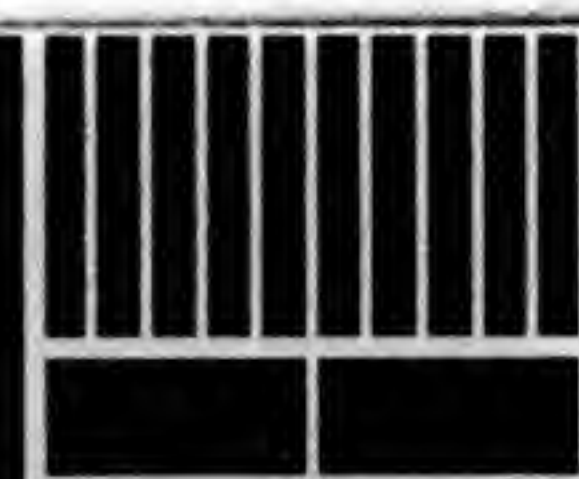
Museum - 1869

seeds extracted from the cone

which is 5 1/2 inches long



seed 9-10 mm long 7 wide
wing 16-17 " " 9-10 wide



0
cm

1

2

3

4

5

6

7

8

9

10

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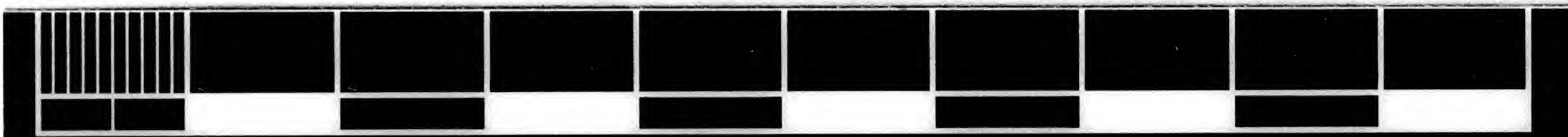
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11499
bbh11



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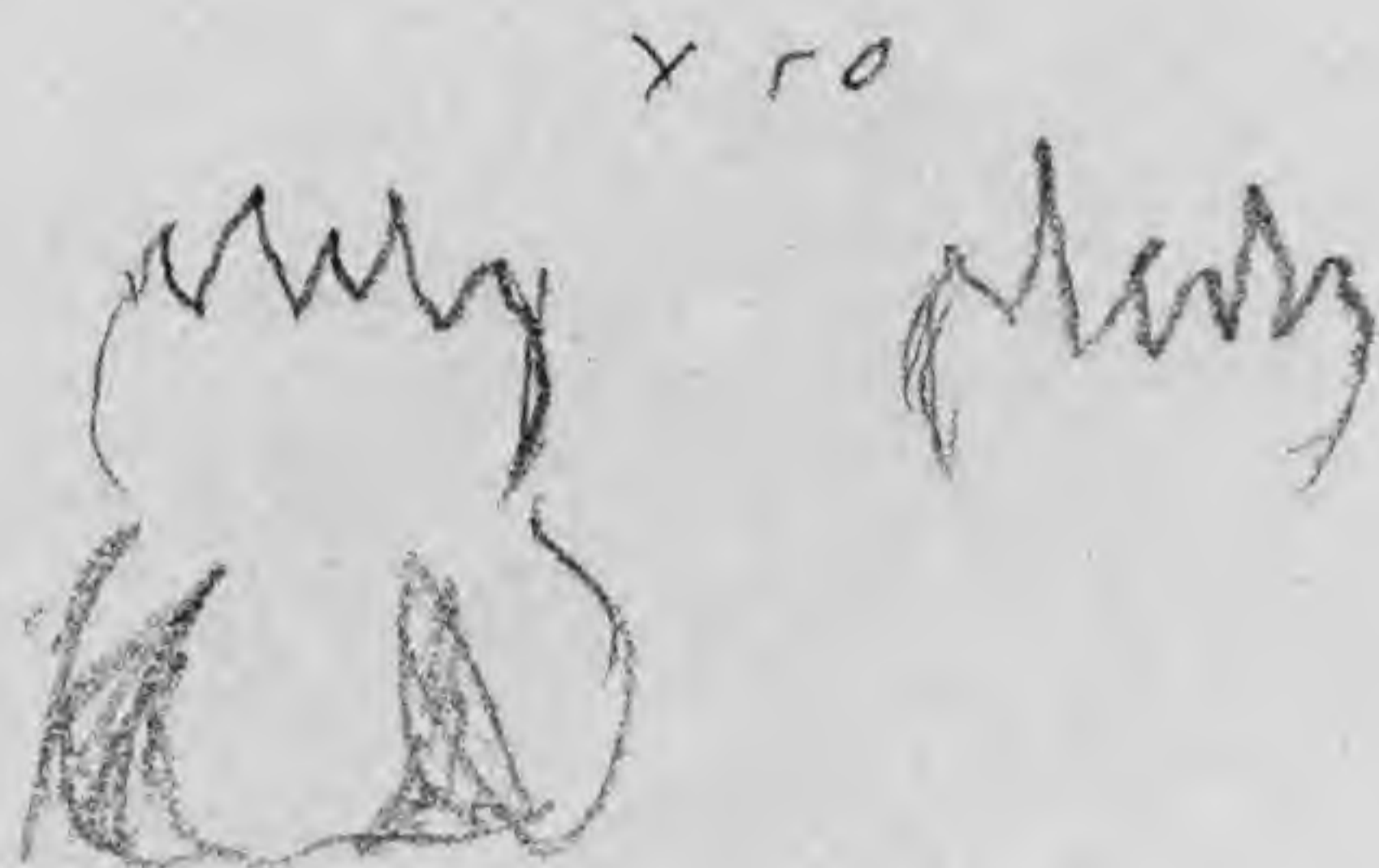
MISSOURI
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Pinus Gerardiana

Nov 15 1879



single ament
without involucre



0 1 2 3 4 5 6 7 8 9 10

cm

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APOTHECARY.

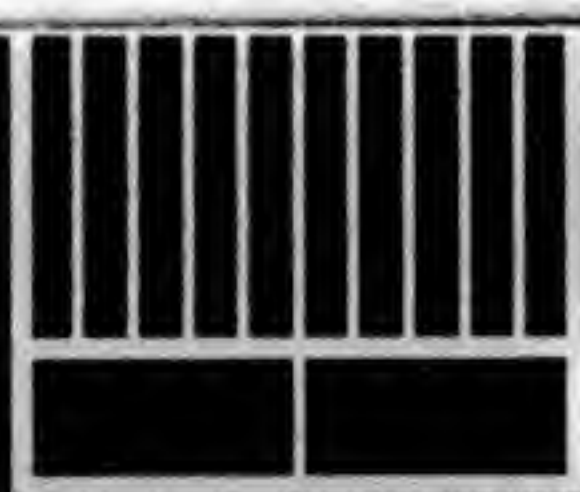
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ST. LOUIS, MO.

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MISSOURI BOTANICAL GARDEN
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11500



0

1

2

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cm

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MISSOURI
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Pinus Gerardiana
no. 2. from New

March 11 1880



wing

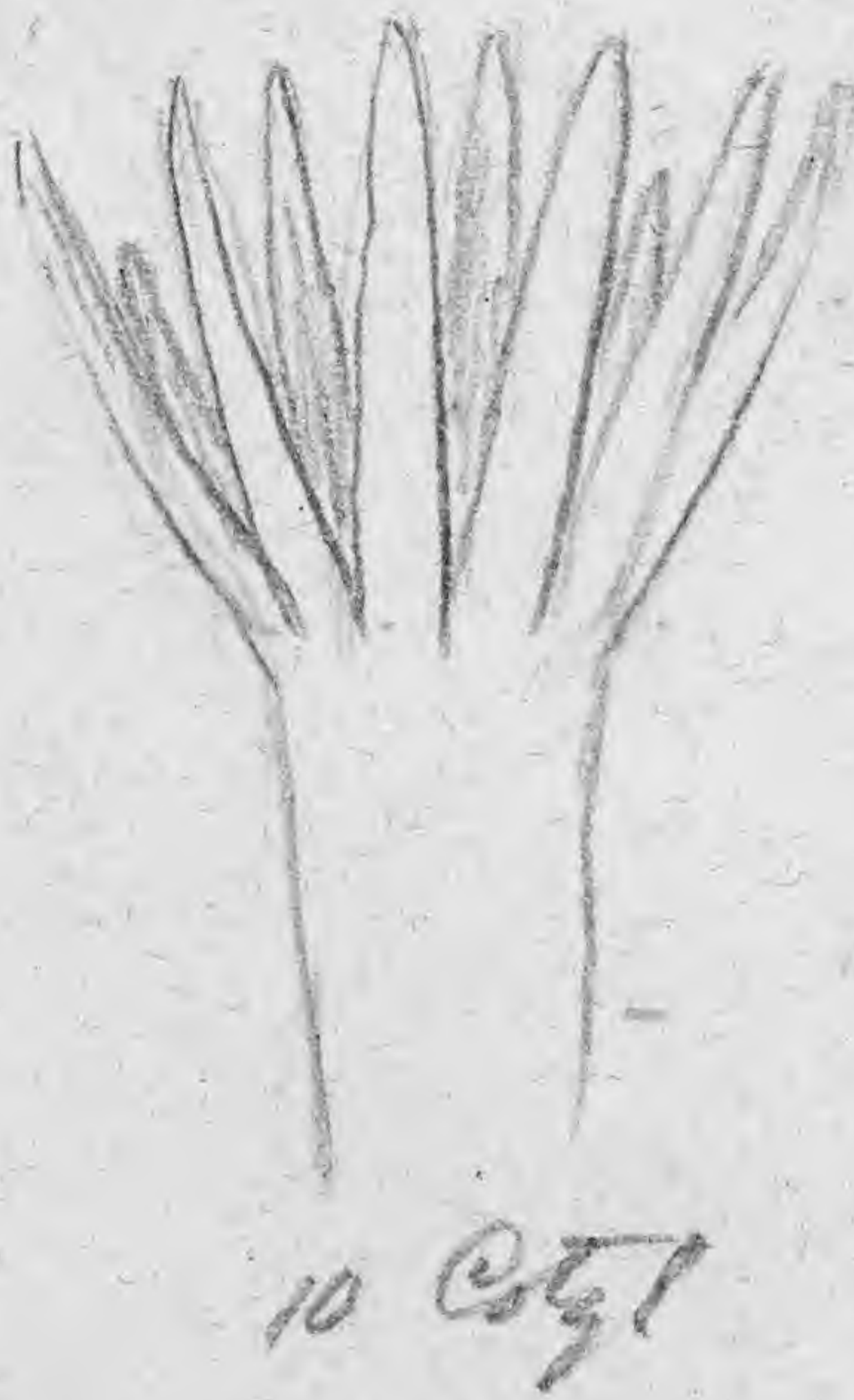
seed



albu
&
embry x 4



10 cotyl



10 Cotyl



0 1 2 3 4 5 6 7 8 9 10

cm

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11501



0

1

2

3

4

5

6

7

8

9

10

cm

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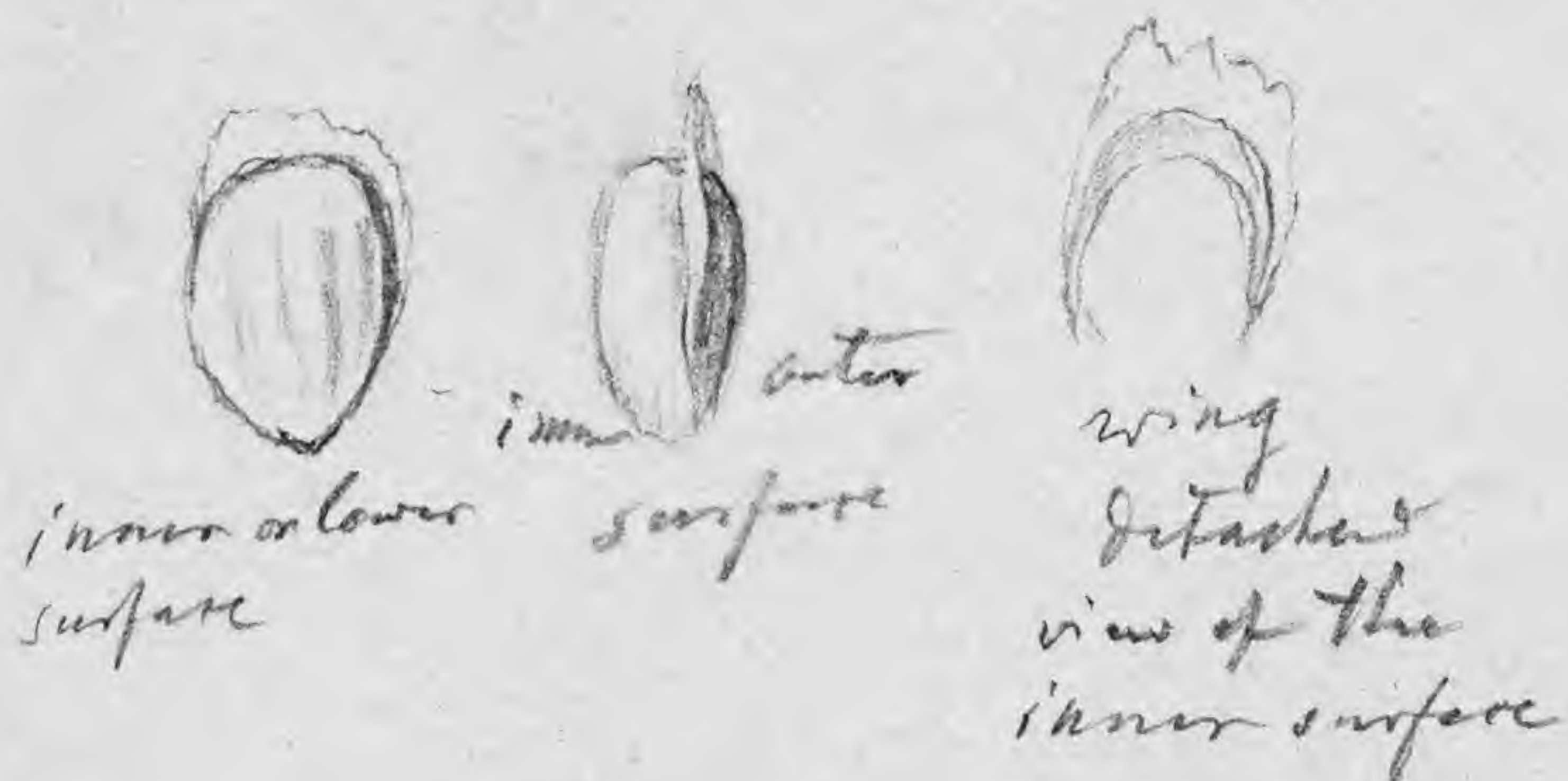


MISSOURI
BOTANICAL
GARDEN

Pinus Bungeana

Nov 3 1879

J. Hoopes, West Chester Pa coll

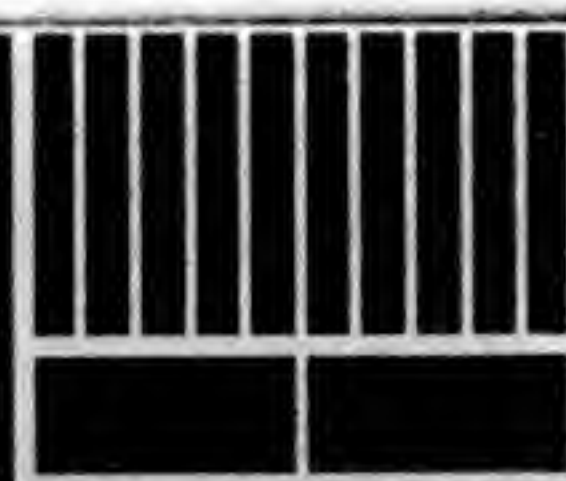


11 Cotyledons
(10-12?)



$\frac{2}{13}$ order
about 40 scales
scales transversely wrinkled

transverse ridge of scales very prominent
stout prickles recurved



0 1 2 3 4 5 6 7 8 9 10
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